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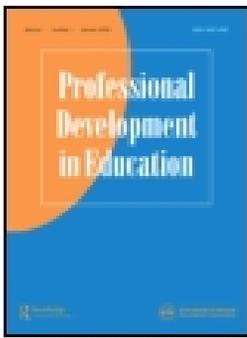
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# Teacher development through language-related innovation in a decentralised educational system

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## ABSTRACT

This study explores how early childhood education and basic education teachers develop and develop innovations within the decentralised educational system of Finland. The comprehensive dataset of 20 field interviews provides a range of insights into teachers' goals, principles, inspirations and experiences when working with a variety of language-based innovations across Finland. The ecological perspective employed in the study highlights the complex relationships between the different ecosystems of education. With the particular focus on the educator-exosystem relationship, the findings indicate how Finnish teachers respond to the expectation to continuously develop and innovate as key change agents in education. The findings also outline ways in which teachers' development and innovation is fostered and disrupted within the educator-exosystem relationship. This study highlights the importance of pre-service teacher education in preparing teachers to innovate and to develop within a decentralised educational system. Moreover, this study highlights the need to ensure that the professional repertoire of teachers goes beyond pedagogical considerations to include interpersonal, organisational, critical and reflexive skills that mediate and sustain the development of teachers within the wider ecology of education.

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## KEYWORDS

Teacher development; innovation; exosystem; language education; Finnish educational system

## Introduction

This article is based on findings from a project (IKI) established to enhance language-based innovations in Finland from early childhood education (ECE) and through basic education (BE) to the age of 16. Finnish teachers have a significant amount of freedom to develop and implement innovative approaches as the national curricula (FNAE 2014a, Finnish National Agency for Education 2014b, 2018) outline the values and goals of education, without prescribing particular approaches. Teachers can, therefore, be considered as key policy agents in the implementation of education, especially with the introduction of new curricula (Tarnanen and Palviainen 2018). The focus of the IKI project is twofold: firstly, to map, share and develop language-related innovations, and secondly, to support the development of stronger community relationships across and between different levels of education. This study explores how involvement in the development and implementation of language-based innovations informs the professional development of teachers and contributes to the ongoing development of research-based teacher education in Finland (Krokfors *et al.* 2011, Tirri 2014).

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This article begins with a brief description of teacher education within the Finnish context before providing an overview of different conceptualisations of in-service teacher development. The theoretical framework then introduces the ecological perspective used in this study to make sense of the different layers, or ecosystems, that inform the overall ecology of teacher development (e.g. Godfrey and Brown 2019) with particular focus on the exosystem, that is, the interconnection between educators and the wider educational environment (Heikkinen 2020).

### **The Finnish educational context**

Since the early 1970s, Finland has developed research-based teacher education requiring all teachers working in basic education (BE) to hold Master's degrees. Class teachers, qualified to teach in grades 1–6, hold Master's degrees in education; subject teachers, qualified to teach their subject at all grade levels, hold Master's degrees in their subject(s) with a minimum of 60 study points in pedagogy (Väljjarvi and Heikkinen 2012). ECE teachers hold at least Bachelor degrees in education and currently there are moves to raise this requirement to a Master's degree. Pre-service teachers are expected to engage with the theory and practice of education throughout their studies and to complete Bachelor and Master theses. Teacher educators are obliged to engage with research, whether as 'consumers' of research up-to-date with contemporary developments or as producers of research (Maaranen *et al.* 2019). In-service teachers are expected to manage their own professional development through lifelong and lifewide learning (Heikkinen *et al.* 2012).

Since the 1990s, curriculum reforms have increased the pedagogical freedom of teachers, and international assessments have replaced school inspections (Jakku-Sihvonen and Niemi 2006). Moreover, the Finnish policy of decentralisation in education means that recent curriculum renewal processes involve deliberative negotiations between different educational stakeholders (e.g. teachers, disciplinary experts, policy makers, parents) at national, regional and local levels (Lavonen 2017). A critical feature of the current curricula is the emphasis on language education and language-aware education as 'every teacher is a language teacher' (e.g. FNAE 2014a, p.28). Although Finnish students have been required to study both national languages (Finnish and Swedish), as well as at least one foreign language from grade 3 onwards in previous curricula, the new curricula support the introduction of language education within ECE and preschool, at the latest, in grade one. Moreover, current curricula (2014a, 2018) include chapters on bilingual education outlining a range of options from total immersion to language-enriched activities. This is in addition to the teaching of foreign languages (e.g. German, French, Russian, Spanish) and Finnish or Swedish as a second language for newly arrived students. With the renewal of national curricula for early childhood, preschool and comprehensive education in recent years (FNAE 2014a, 2014b, 2018), the Finnish Ministry for Education and Culture, plus the National Agency for Education have released funds to support the development of key areas in the curricula. These funds have been available to municipalities, educational communities as well as universities and require collaboration between different educational stakeholders. This study examines how educators respond to the promotion of language-based innovations within this decentralised educational setting.

### **Approaches to teacher development**

Teacher development has long been recognised as a complex process that involves the development of pedagogical understanding and practice (Shuman 1996 and 1997; Loughran 2019) and the ability to reflect and to learn through experience and action (e.g. Dewey 1938/1997; Schön 1987, Van Manen 2008). This complex process has been researched as individual- and community-based activity that can promote teacher development as compliance with mandated policies or support the autonomy and agency of educators (Borko *et al.* 2010, Lambirth *et al.* 2019). Individual teacher development has been framed in terms of professional maturation through service (e.g. Day and Gu

2010), examined through the lens of teachers' existing and potential practice (e.g. Clarke and Hollingsworth 2002) and teachers' pedagogical reasoning (Loughran 2019). Community-based development more broadly recognises the potential of collegial relationships to nourish or undermine professional development (Hargreaves 2003, Timperley 2011) and the significance of the relationship between students and teachers (e.g. Timperley *et al.* 2007). These different directions in research on teacher development highlight the complexity of teaching as situated activity.

As 'frontline' practitioners, teachers play an important role in the implementation of policies, curricula and innovations (Priestley *et al.* 2013, Lavonen 2017). For professional development to contribute to positive change and reflexive teacher agency, however, it should support pedagogical understanding and collaboration (Kirsch *et al.* 2020). Moreover, research points to the value of teachers actively participating in research on their own practice and student learning to develop a critical approach to educational development and change (Timperley *et al.* 2007, Kirsch *et al.* 2020).

In Finland, in-service teacher development is largely based on teacher autonomy, a constructivist view of development, pre-service teacher education and informal activities such as pedagogical cafés (e.g. Heikkinen 2015). Although the Ministry of Education and Culture as well as the independent Finnish Education Evaluation Centre regularly conduct reviews monitoring the quality of educational provision across Finland, in-service teacher education is usually organised at a local level. Regional authorities can decide what kind of training to provide and what themes to address, such as new assessment practices. Public and private services can provide training, and teacher development activities can take place within educational communities or implemented as individual activity. The agreement negotiated by the Finnish teachers' union, however, means that employers can assign no more than 12 hours of working time a year to co-planning (six hours) and training and planning work (six hours). In addition, teachers in basic education have 126 hours a year to use for planning and follow-up work with immediate and local partners (FTUE 2020) although how these hours are used is decided between each educational community and their municipality with practices differing throughout the country. Within this decentralised system, it is primarily through this open-ended system that innovative approaches and activities are shared with and developed by practitioners largely leaving the responsibility for teacher development with the teachers themselves. This raises the questions how do educators develop within this open-ended system and whether the conditions of this system can 'promote and value experimentation, risk-taking and innovation and that facilitate change that emerges from teachers' own ideas, feelings and practices' (Daly *et al.* 2020, p. 657).

## Theoretical framework

The complexity of educational communities and the way in which effective teacher development is interwoven with the fabric of the local environment has promoted the use of various metaphors to investigate teacher development. Hargreaves (2003) uses rail networks as well as emotional landscapes, Kirsch *et al.* (2020) refer to an onion model that peels back layers or cuts through cross-sections to examine the professional development of teachers and Daly *et al.* (2020) refer to the 'nuanced dance' of educators and educational communities 'continuously responsive in interacting with the policies, resources and colleagues' (p.656). In our research, we draw on an ecological perspective to acknowledge the interconnectedness of different levels that form communities and the critical relationships between individuals and their environment (Toh *et al.* 2014).

An ecological perspective recognises the individual-environment relationship as mutually-constituting; this is not a 'one-way' relationship, rather they influence the development of each other. This relationship is receptive-responsive (Rayner 2011) with the environment and individuals constantly 'listening' to and informed by each other. The dynamism of this relationship is sustained by the affordances provided through the conditions of the environment (Van Lier 2004) and the agentic responses of individuals choosing whether and how to use resources and

opportunities (Biesta and Tedder 2007). Actions taken by individuals in turn changing the environment. A key difference, however, between biological and social ecosystems is the way in which human actors can choose whether to engage with the affordances of the environment. Teachers can choose whether to use suggestions presented in-service tasks and activities, head teachers can choose whether to sit alongside their teaching staff or to withdraw from conversations (e.g. Priestley and Drew 2019), educational authorities can choose to invest in practitioners' initiatives (Timperley *et al.* 2011). Through these interactions, however, new features emerge and develop as part of the wider ecology. Some emerging features are anticipated, others are unexpected (Daly *et al.* 2020), nevertheless, over time actions, expectations and perceptions of community members can stabilise this relationship to create a level of ecological coherence and ecological memory (Toh *et al.* 2014).

Ecological coherence and memory can become habitualised in the expectations and requirements of colleagues, parents, educational authorities, as well as in the practices of multiprofessional teams and disciplinary knowledge. These habits 'oil' the cogs of daily life (Kraftl 2013) and become generalised over time (Owens 2017). As habits stabilise, however, changing conditions can become more demanding. Rupturing habits destabilises the link between past and present and familiar resources are less appropriate creating 'risky moments' (Vanderstraeten and Biesta 2006) prompting further change and emergence in turn reforming the balance and potential of the individual-environment relationship.

From an ecological perspective, the individual and environment are distinct yet inseparable (Rayner 2011): The ecology is not the individual plus the environment, but the individual and environment *in relation*. A healthy individual-environment relationship should provide sufficient conditions for both individuals and the environment to thrive (Heikkinen 2020). Brofenbrenner's (e.g. Brofenbrenner 1988; Brofenbrenner and Morris, 2006) theorisation of human development as situated within nested ecosystems has provided a critical lens for examining the proximal and distal processes of development in different settings as well as the temporal features of the different ecosystems.

Different ecosystems are based on the proximity of the environment to the individual, whether it is an environment that the individual engages with on a daily or occasional basis (see Figure 1). Whilst the microsystem represents the everyday working environment which focuses the overall activities of the teachers, this level is encompassed by the mesosystem comprising, for example, the collegial relationships of a school or daycare centre and the linkages between participants in the microsystem. The exosystem encompasses the linkages of

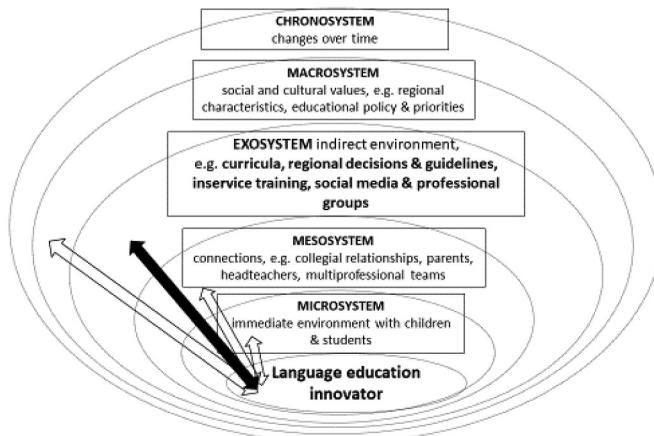


Figure 1. Illustrating the different levels of an educational ecosystem.

the mesosystem and represents the material realisation of the social and cultural values of the macrosystem, that is, the government and wider society. Although teachers do not have regular, direct engagement with the exosystem, this ecosystem can have a profound effect on the day-to-day activities of educators. The curriculum, regional decisions and guidelines, as well as in-service training and social media that belong to the exosystem can require and incentivise teachers to adopt new approaches and to reform habitual ways of being and doing, albeit as distal participants (Guerrettaz and Johnston 2013). Current research suggests that carefully developed activities and relationships fostered in the exosystem can transform educational communities (e.g. Priestley and Drew 2019), although exosystem initiatives can also appear to be effective, without promoting significant change (e.g. Toh *et al.* 2014).

The overall ecosystem is more than the sum of the parts and the interconnections between and within the ecosystems co-create a complex ecology. The dynamic quality of ecosystems is fostered through the vital relationships between the different parts of the ecology, the individuals and ecosystems. Environments and individuals can provide resources for each other and through this relationship new opportunities and affordances emerge (Van Lier 2004, Daly *et al.* 2020). Moreover, ecosystems at different levels resource one another through their interconnections (Godfrey and Brown 2019). Especially in a decentralised educational exosystem, the choices, responses and actions of teachers have significant implications for the realisation and development of education. How the conditions of a decentralised exosystem foster or disrupt teacher development and how teachers respond to the changing conditions of a decentralised exosystem are little understood.

## Research task and questions

This study focuses on how the exosystem of Finnish education informs and is formed by the practice and professional development of teachers in the decentralised Finnish education system. Our research questions are:

1. What skills does the exosystem in Finnish education require from educators as agents of innovation and development?
2. What features of the exosystem-educator relationship *foster* and *disrupt* teacher innovation and development?

## Methodology

This qualitative study is based on interviews with teachers (n. 20) working in ECE (n. 10) and/or BE (n. 10). The approach to both data gathering and handling have adhered to the guidelines from the Finnish National Board for Research Integrity based on the General Data Protection Regulation. The participants had responded to a request from the IKI project to observe and interview teachers involved in the development of language-related educational innovations and as such represent teachers positively disposed to innovation. [Table 1](#) provides an overview of the participants, their educational setting and type of language education they are involved in. All names are pseudonyms and no identifying information is included in the reporting of this study.

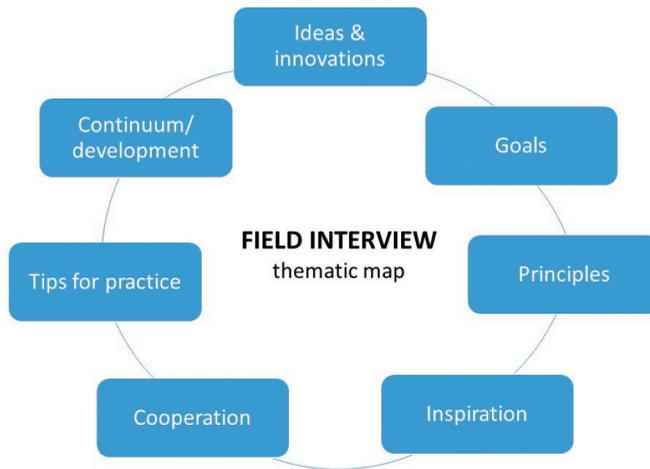
The aim of the field interviews was to provide a space for teachers to share their perspectives on and experiences of working with language-related innovations. The interviews began with a brief explanation of the IKI project and the interview, ensuring that all appropriate permissions and any questions were addressed. The participants were then provided with a thematic map (see [Figure 2](#)) to guide their responses in the interview, but they were free to decide what and how to share their experiences (Tracy 2019). In addition to the map, prompt questions were used if necessary, such as, what kind of collaboration was involved in the development of the innovation or how they hoped the innovation would continue to be developed.

**Table 1.** Participants, educational and language innovation contexts

Pseudonyms	Educational setting	Context for innovative approaches and activities <sup>1</sup>
Anna	ECE	Swedish language immersion
Marja	ECE	Finnish as a second language and Finnish-Swedish bilingual pedagogy
Leena	ECE	Swedish (and German) language showering in preschool <sup>2</sup>
Päivi	ECE	English Language showering
Tuula	ECE	English Language showering
Ritva	ECE	Early introduction of English in preschool
Pirjo	ECE	Early introduction of English in preschool
Sari	ECE	Early introduction of English in preschool
Tarja	ECE	English club
Aino	ECE	Language aware approach with an emphasis on the development of Finnish as second language
Elisa	ECE and BE	German language preschool and grades 1-2
Eeva	ECE and BE	German language preschool and and grades 1-2
Raija	BE grades 1-6	English and Spanish in the lower grades
Helena	BE grades 1-6	Early introduction of English, French and Swedish
Anneli	BE grades 1-6	Early introduction of French
Marjatta	BE grades 1-6	English in the lower grades
Pirkko	BE grades 7-9	English and Swedish language education
Sofia	BE grades 7-9	English and Swedish language education
Annikki	BE grades 7-9	Swedish and Russian language education
Lotta	BE grades 7-9	Swedish language education

1 For a more detailed explanation of innovative approaches and activities in language education see European Commission 2011. Language learning at a pre-primary school level: making it efficient and sustainable. A policy handbook [online] [http://ec.europa.eu/languages/policy/language-policy/documents/early-language-learning-handbook\\_en.pdf](http://ec.europa.eu/languages/policy/language-policy/documents/early-language-learning-handbook_en.pdf)

2 Preschool is one year of compulsory education for six year olds before entering the basic comprehensive school system

**Figure 2.** The field interview thematic map.

The interviews, conducted in Finnish and/or Swedish, were transcribed and saved in a secure location provided by the university. The first step in organising the data for the theory-led thematic analysis (Braun and Clarke 2006) was to examine whether and how different ecosystems were identifiable within the teacher interviews. Using the definitions of different ecosystems (e.g. micro-system, exosystem) the relevant extracts from the different interviews were collated into sub-datasets under different headings. In a forthcoming study, we explore how innovations are shaped within the microsystem. In this study, we focus teacher development in relation to the exosystem.

The exosystem dataset comprises twenty eight pages of font 12, 1.5 line spacing extracts in which the participating teachers explain how they gather and modify materials from outside their

immediate community, how they use digital media, how training sessions and visits contribute to their practice, their collaborations in projects and research activities, and how administrative decisions and curricular changes affect their work. Once the dataset was organised, the theory-led thematic analysis involved coding and specifying different aspects of the educator-exosystem relationship (Braun and Clarke 2006, Vaismoradi *et al.* 2013). The different codes were collated under three heading: Requires, Strengthened by, Weakened by. ‘Requires’ refers to what teachers have to be able to do to in order to engage with the affordances of the exosystem, ‘Strengthened by’ identifies features of the exosystem that appear to foster positive engagement between teachers and innovations, and ‘Weakened by’ includes the features that undermine or disrupt innovative activity or development (as illustrated in Table 2). During this stage, the coding of the data was organised with reference to the different features of the exosystem (e.g. materials, local curricula, municipal decisions). The team members checked the integrity of the analysis of the extracts and any uncertainties were clarified with reference to the interview transcripts (Vaismoradi *et al.* 2013).

**Table 2.** An extract from the primary-cycle coding stage with colour codes indicating which level of the educational level the teacher participants were referring to and participant codes to support member check of the codes

Includes/ provides	Requires	Strengthened by	Weakened by
<b>Materials</b>	a degree of creativity and organizational skill to build connections between children, the new language and practical possibilities	easy to use (VAKA 1) contribute to children’s language development (VAKA 1) align with teacher beliefs (VAKA 1) (YLÄK 4) children enthusiastic (VAKA 1) systematic organizing of materials as community activity (ALAK 2) investing time (ALAK 2) being able to integrate with other language –focused activities (YLÄK 4) being able to use tools with different groups (YLÄK 4)	not connecting to a particular theme (VAKA 1) having to update iPad (VAKA 9) not fitting the rhythm of the community (VAKA 9) having to pay for materials (ALAK 1a and b) having no particular source to turn to (ALAK1a and b) unequal provision of materials regarding different languages (ALAK 2) some activities can only be used every-so-often (YLÄK 4)

The next stage of analysis moved to secondary-cycle coding which Tracy (2019) describes as beginning to ‘organize, synthesize, and categorize these codes into interpretive and sometimes disciplinary concepts’ (ibid. 2019, p.202). Taking each of the columns in turn, a more iterative form of analysis was conducted as the focus shifted from the different features of the exosystem (materials, SOME, regional priorities) to recurring characteristics of the teacher-exosystem relationship. By focusing on and synthesising characteristics and conditions of the educator-exosystem relationship, three themes were developed in relation to the research questions (Vaismorandi *et al.* 2013, p. 403). These themes are reported in the Findings.

## Findings

The findings present three themes that provide insights into the how the educator-exosystem relationship works. Both partners in this relationship expect ‘the other’ to meet certain requirements and expectations in the process of transforming the socio-cultural values of the macrosystem into appropriate pedagogical action within the microsystem. The requirements and expectations of the exosystem are identifiable through the skills educators have to employ to transform the innovative material into appropriate pedagogical action. On the other hand, the requirements and expectations the educators have of the exosystem are identifiable in the conditions they expect the exosystem to meet. The first theme focuses on the skills required from teachers in response to the exosystem. The second theme outlines the

conditions teachers expect the exosystem to meet in order to facilitate innovation in different educational settings. The third theme outlines different ways in which the educators-exosystem relationship can be disrupted, in effect limiting the emergence of innovation as part of individual or community practice.

### **Expectations and requirements in the Finnish exosystem**

The findings highlight the significant requirements and expectations made of educators by the exosystem as it is the teachers' task to transform the material realisation of the macrosystem into appropriate pedagogical action. Teachers are not merely conduits that take suggestions for innovation from projects, in-service training or online communities and implement them in classrooms and daycares. To transform potential innovations into pedagogical action requires high levels of agency. For example, teachers should creatively mediate between ecosystems as they respond to local needs in the mesosystem, adapt and modify innovations from the exosystem, and make them suitable for their context and children in the microsystem. Mediating between ecosystems, requires a high level of personal and pedagogical agency as teachers flexibly change practices and ideas, allow for disruptions and take risks. As Tuula and Anna explain, although the training sessions and emphasis of the municipality might not connect with their interest in language innovations, nevertheless, they seek to make the most of all opportunities to develop:

... I've tried in these different trainings sessions to absorb everything into what I teach and all the different subjects (Tuula)

Well [name of the town] emphasizes sport and that, we've got a lot of ideas for that as well as goals for learning through sport that is the town's particular thing, but the language immersion goals, ... we always have to have a language plan as part of this as well (Anna)

Moreover, teachers are not only limited to formal training sessions, but are also willing to draw on their leisure time, life-wide, activities to inform their pedagogical practice. As Pirkko shares, 'for example I watch a film so I twig from the background there that, hey! Something happened there or there is a scene and from that [something] can develop and I start thinking'. Working in this way requires teachers to use their freedom to go beyond what is offered within the immediate or indirect ecosystems of this decentralised system and to create something pedagogically particular and meaningful to them and their students. As Pirjo shares after a colleague has attended a course combining singing and drawing with materials available in English, 'we'll take this on next year and somehow test how it works'.

Modifying innovations for a particular context requires teachers to transform ideas into suitable materials and practices, to understand the context in which they are working including the themes and goals of the curriculum as well as what is practically possible, understand the level of learner development and what is appropriate from them. In addition to mediating between the ecosystems, the teachers have to bridge gaps between different ecosystems using and *satisfying* their own pedagogical reasoning, as illustrated by Tuula and Pirkko:

Because school today requires teamwork skills from pupils and it is part of the town's strategy as well, that [pupils] should manage to learn in teams and we can't in my opinion require that from a child if it hasn't been taught what teamwork means or what working in a group requires (Tuula)

In English-speaking countries, so from there with the net I've been in-touch with many [people] and exchanged ideas, that somehow like you can in a way take the best bits of what is found ... some kind of known play or game ... and I have then adap— modified it so that it suits our Finnish school ... and then in a way maybe I look at material. Sometimes an idea just comes and then I write it down, but quite often it comes from the material and the group - thinking about the pupil group ... and in what way like I could now approach this with them ... what somehow motivates them and gets them moving (Pirkko).

These extracts illustrate the sensitivity required of teachers in response to the environment they are working in, however as Pirkko explains, teachers sometimes become involved in an innovative approach, but

Because I haven't attended any training or read any literature or anything when the first time I started [to try this innovation] it only really came afterwards that then I started to look for some theory for the background and ... to ask whether I'm doing things right and to get some kind of support. (Pirkko)

In other words, teachers have to be able to critically evaluate their own ability and level of development, and to seek further information to fill any gaps they notice in their own practice or understanding pointing to the high degree of reflexivity expected by the Finnish exosystem.

In addition to high levels of personal and pedagogical agency, pedagogical reasoning and reflexivity, the teacher interviews highlighted the requirement to have good organisational and interpersonal skills. Teachers need to be able to manage commitments, meet deadlines or work within timeframes that can be significantly different to their day-to-day routines and community activities. To be able to benefit from innovations that are made available in the exosystem, an arena teachers are often only indirectly involved in, they need to be able to maintain communication with others within and beyond their community, to coordinate different kinds of activities and to build new connections. These organisational and interpersonal skills require openness to others, the ability to share ideas with colleagues, as well as to ask and respond to questions, that is a high level of relational agency. As Ritva explains:

But our core group, so we try each time to find ways of taking language forward, so some kind of completely new teaching metho., things so the structure of the session isn't always the same ... We find different options ... and we've prepared for all [town name] preschoolers, first and also now second graders some language-enriched lessons (Ritva)

The demands and requirements outlined here point to the extensive agency, pedagogical expertise and critical thoughtfulness that teachers have to draw on if they are to innovate and develop in response to changes in the Finnish exosystem. In addition to the 'nuanced dance' of educators and educational communities responding to policies, resources and colleagues (Daly *et al.* 2020), the findings in this study point to the multiple ways educators mediate between ecosystems transforming policy into particular practice appropriate for them as educators and appropriate for their community of learners. These extensive requirements and expectations appear to suggest a rather one-sided relationship between educators and the exosystem. The findings from the second theme, however, indicate how these Finnish educators also have requirements and expectations that the exosystem should meet in order for teachers to invest in innovation and development.

### **Features of the educator-exosystem relationship that foster innovation and development**

As the material realisation of the social and cultural values of an educational system, the exosystem is imbued with authority and expectation. While in some educational contexts innovation and development should be fostered within the mesosystem with educational leaders responsible for fostering change (e.g. Priestley and Drew 2019, Daly *et al.* 2020), the decentralised system of Finland anticipates educators to act as change agents (Tarnanen and Palviainen 2018). The innovative educators in this study, however, appear to have clear conditions that they expect the exosystem to meet.

The findings highlight the importance of the innovations resonating with educators as pedagogical professionals. The educators shared a range of different ways in which innovations resonated with them and the further affordances this brought. As Annikki explains,

and I myself at least find it so the richness of this work that new tools come, new applications, new ways, [it] is really nice to go to some training and to learn some trick for something and every-so-often I rarely invent some thing that now is interesting to some of the pupils . . . . (Annikki)

If an innovation resonates with educators it is found to be inspiring. An innovation that resonates with the existing beliefs and activities of educators seems more likely to become part of an existing pedagogical repertoire. Moreover, if an innovation resonates with educators this seems to afford a good foundation for further development. Another way in which an innovation can resonate with educators is through the positive responses of students as, for example, Tarja shares,

there is this caterpillar that all the children themselves can act . . . and then comes all the days of the week and . . . then comes foods and amounts and week days and, that it is quite nice, the children like this ever so much (Tarja)

If an innovation resonates with an educator, then they can consider how to modify and adapt the innovation rather than having to spend time and energy critically reflecting on whether this is an innovation worth investing in. Innovations that resonate with educators appear to be more readily woven into the fabric of the community and to provide material for the critical reflection of educators. As Anna notes,

The [XX] material that we've managed to go through over the last year, it's not attached to any particular theme we just sort of use the moments every so often and we've noticed that it really helps with language awareness so much (Anna)

As innovations are absorbed into the working of educational communities, the teacher participants appeared to gain broader perspectives and further, potential developments begin to take shape as new affordances form within the environment. As Helena shares when reflecting on what she has gained from project activities,

What I've done with the small ones [younger children] I've taken to the bigger [older students] and with the big ones so to the smaller. So like that. Those that work so those [you] can do it so in both directions. Definitely that [project name] and that language . . . here for early grades language education has also brought more perspectives into my teacherhood for working with the older ones (Helena)

Innovations can also resonate with educators through the vicarious experience of colleagues. For example, if a teacher has seen another teacher carrying out an activity or has experienced the activity for herself, then the teacher is more likely to be confident that this idea can be concretised in her own setting. In these instances, colleagues act as valued and trusted mediators between the exosystem and educators. Moreover, the participating teachers appreciated the combination of freedom and inspiration. In this study, even seemingly non-language related initiatives could be inspiring and integrated with the language interests of the teachers enabling emergent, rather than prescribed, forms of innovation such as the combination of the town's emphasis on sports and the educators' interest in language immersion.

Another way in which innovations resonated with educators was through the rhythm and established routines of the community. For the educators, it was important whether a new activity was carried out on a daily, weekly or occasional basis and whether the innovation could be adapted to their existing routine. If an innovation resonates with the themes teachers have chosen to work with or the goals a community has established, then the innovation is more likely to be adopted into and modified by the community. If an innovative activity can be used more than once with different groups and on different occasions, this also seems to foster the relationship between the teacher and exosystem, or if the teachers could see multiple benefits of using an activity. For example, if it created opportunities to use language(s) in different ways, including different modalities or creating a greater space for more students to participate than usual. As Lotta shares,

I've used all kind of those online applications but then again I don't feel that I myself am terribly innovative because I've used good things developed by others but those that I've found, so those I've liked, I've used in

diverse ways because in many of them is they kind of advantage that then with these [you] can get the kind of pupil involved that wouldn't necessarily be interested in pen-paper activities (Lotta)

The findings suggest that there are a number of different ways in which a positive partnership between educators and the exosystem can be fostered. The findings suggest that for an innovation to become part of an educator's pedagogical repertoire or part of the practice of an educational community, however, it has to resonate in some way with educators. For the educators in this study, however, innovations can resonate with existing beliefs, student responses, personal or vicarious experience or acquiescence with community routines and rhythms. If an innovation resonates with educators, they arguably do not need to invest time and energy becoming familiar with the basic idea, but can rather invest in adapting the innovation to the particularities of their environment. It is important to note, however, that resonance does not suggest teachers are unwilling or unable to innovate and change. Indeed, several of the examples shared by the participants point to the way one innovation led to the emergence of another innovation. The findings for the third theme, however, indicate how this potential can be disrupted.

### ***Features which disrupt the relationship between the exosystem and teachers***

The teacher participants in this study had volunteered to share their experiences of innovating as individuals and in communities. They had the confidence to positively respond to the interview request and felt they had something to share. Nevertheless, the findings indicate that these educators also used their agency to resist innovations. The final section of the Findings outlines different ways in which the educator-exosystem relationship could be disrupted, undermining the introduction and development of educational innovations

Whereas innovations were readily taken into community and pedagogical activities when they resonated with educators' pedagogical reasoning or community rhythm if teachers do not observe positive responses in the students or the innovation is out-of-sync with the established rhythm, then an innovation is less likely to be adopted or maintained. As Tarja remarks:

I haven't personally liked that [X] game so much, because it should be [done] everyday, and then when we have that moment once a week so it hasn't produced the result ... (Tarja)

Another temporal disjuncture present in the findings was between the duration of the project and the need to finalise materials according to the project, rather than community, timetable. As noted by Ritva:

because the funding will end so now we should have had all of the material finished and all of the things that there are. (Ritva)

The potential disruption of this disjuncture appeared to be exacerbated by the uncertainty of not knowing whether funding will continue after the duration of a project or whether a headteacher or daycare manager considered an innovation significant enough to invest resources. Participants pointed to the curriculum as an impetus for change, but this impetus is disrupted if materials or practical support for teachers to implement innovations or to develop as innovators are not provided.

Within the Finnish educational landscape, municipal educational authorities have the freedom to develop regional priorities along with regional curricula based on the national curriculum. If, however, municipal priorities do not align with teachers' views or if the municipality or local educational community cannot coordinate the educator-exosystem relationship, the potential for development is disrupted. One example is whether educators have or can get permission to use materials that require a fee. This issue was particularly raised by teachers working with languages other than English. Inappropriate training or the inability of communities to coordinate internal collaboration to develop innovations were also mentioned as possible ways in which the teacher-

exosystem relationship could be disrupted. These examples underline the importance of multiple layers of the overall ecology complementing each other as they mutually inform one another. Elisa and Eeva, colleagues from the same classroom community, critically remark:

Then how would collaboration then work if your partner is in a different building or belongs to a completely different area of government? . . . When some kind of co-operation is needed and how it can be implemented, then that is now left to the responsibility of those co-workers (Elisa)

Well we're not asked [how we would like to develop our activities] . . . (Eeva)

[for example, now] we have to move towards teaching that is not bound to the age group or grade (Elisa)

With their long history of collaboration, Elisa and Eeva had worked out how to work alongside one another, regularly planning teaching together although working with different classes. Their remarks, however, cynically point to authorities arbitrarily arranging how colleagues should collaborate inadvertently disrupting the rhythm of ongoing and potential for further development and innovation, rather than providing conditions that can foster the emergence of further innovation.

Some of the participants felt that the lack of formal profiling and disagreement at a municipal level on which profiles to promote within a region undermined long-term continuity and the organisation of language education. As Marja reflects, 'well, yes, I somehow think that if this [group] would be a kind of official bilingual group, well, yes, I think that the language side would increase quite significantly', but to assign a group as bilingual is beyond the remit of individual educators or even educational communities. Moreover, variation between municipalities created a sense of uncertainty as educators felt that their innovations were perhaps misunderstood or undervalued. This uncertainty could also be exacerbated by the inability of educational communities to choose who has access to their education, a responsibility kept in the hands of the municipality.

In addition to the role of educational leadership, the personal-professional stance of teachers could also disrupt the educator-exosystem relationship. If teachers are not able to reflect or systematically work on their own development, then the experience of continual development becomes chaotic as Raija reflects, 'I'm not in anyway orderly perhaps but I suppose it is just some continual process that like oneself in one's own head goes through and discusses with others'. Although for Raija this seems like a process of creative chaos, for less agentic teachers or teachers less confident to innovate, this process could be less positive. Moreover, participants noted how it is possible to be overwhelmed by the demands of tasks and activities coming from the exosystem:

on the language teaching side there are to some extent these types that somehow diversely invent all kinds of things all the time, but I know that some get so completely anxious about this that [they] go to some course where there are a million completely new things that can be done and how can that person get the time . . . (Annikki)

As this final example illustrates, through the educator-exosystem relationship innovation can emerge and be fostered, but also disrupted by anxiety of an individual and chaos of an environment. It is at this point that we turn to the implications and limitations of these findings.

## Discussion

Within the decentralised educational system of Finland, the educator teacher-exosystem relationship is highly significant. Although Finnish teachers are 'responsible for participating in local curriculum work, engaging in broad planning of learning environments and courses and assessing their teaching abilities and their students' learning outcomes' (Lavonen 2017, p. 54), it is within the educator-exosystem relationship that changes in educational policy and curricula are brought to the

attention of teachers and the conversion of policy into appropriate pedagogical practice begins to take shape.

The findings highlight that in response to the exosystem teachers are required and expected to: act with a high levels and different forms of agency (e.g. Priestly and Drew 2019); to navigate different affordances and potential emergences (Van Lier 2004, Daly *et al.* 2020); and transform innovations into locally-situated pedagogical actions. The findings indicate how the teacher-exosystem relationship is mediated by the pedagogical expertise of teachers, their pedagogical understanding and relationships as well as by the linkages between teacher colleagues and educational leaders. In these activities and relationships, Finnish teachers are expected to draw on professional skills that go beyond pedagogical reasoning (Lochran, 2019) or reflection (Van Manen 2008) required within their familiar microsystem.

The findings also illustrate what features of the educator-exosystem relationship foster or disrupt how educators respond to the expectations of the exosystem and also set their own expectations for the exosystem. A key feature of this relationship is resonance as the needs and interests of the different partners meet and amplify one another (Polias and Education 2010) fostering conditions for the emergence of further innovation (Daly *et al.* 2020). Another feature is the importance of synchrony of temporal and practical arrangements within and between different ecosystems. The findings indicate how lack of synchrony and poor coordination can create such gaps that teachers perceive as too extensive for teachers to bridge. Whereas temporal synchrony points to connections between different ecosystems, e.g. the duration of a project and the developmental pace of a community, coordination points to the mediatory role of the mesosystem and the relationship between educators and educational authorities. The final feature, however, points to the personal-professional skills of educators to manage the demands and opportunities that are characteristic of education as a dynamic ecology.

These findings raise questions and considerations relevant to the Finnish educational context and the theorisation of education from an ecological perspective. One important question is how are teachers prepared to partner the exosystem during their in-service training? Finnish teachers may have a research-based teacher education (Tirri 2014) which encourages the development of a critical relationship between the theory and practice of education, but little attention is given the way in which in-service educators continue to draw on or disregard ongoing research or theoretical developments. It is striking in the dataset that the teachers refer to 'tricks' and 'hints' with reference to innovations that they 'pick up' and 'gather'. This could be an example of teachers using the 'shorthand' to couch sophisticated reasoning in everyday language and practices (Loughran 2019). This could also suggest, however, that teachers themselves do not fully recognise the sophistication of their professional practice or the value of using theories to examine their actions, intentions and student responses (Timperley, et al. 2009). Developing a broader repertoire for sharing pedagogical reasoning might well enrich the educator-exosystem partnership as well as interactions with and between other ecosystems.

Recognising the role and presence of different ecosystems as part the ecology of education in teacher education would be a significant development. This study underlines the dynamic educator-exosystem relationship that fosters innovation, but also the vulnerability of this relationship and the influence, even interference, of other ecosystems. Recognising the nested and interconnected ecosystems of education (Godfrey and Brown 2019) provides a clearer basis for a more expansive approach to pre- and in-service teacher education going beyond pedagogical understanding and practice. As this study illustrates, pedagogical reasoning and reflexivity play important roles that enable teachers to mediate between the expectations of the exosystem and their own communities, but pedagogical reasoning and reflexivity also mediate the teachers' relationship with the exosystem and the potential resonance with an innovation. If pedagogical reasoning and reflexivity can be habitually recognised by the exosystem, rather than a 'hidden' agenda that teachers adhere to, there is greater potential for the educator-exosystem relationship to be a productive partnership.

These findings also add to conceptualisations of education as an ecology comprising nested ecosystems. Recognising that the boundaries between ecosystems are not definitive as suggested by the onion metaphor (Kirsch *et al.* 2020), but rather indicative of encounters between different educational stakeholders can help to recognise the different skills, challenges and affordances that are part of professional and educational development. Recognising the dynamic interrelationships between different ecosystems and teachers indicates the importance of deliberately developing coherent ways of interacting that enable teachers to use affordances on offer (Toh *et al.* 2014). If previous experiences anticipate future activities (Biesta and Tedder 2007), working towards coherent forms of collaboration is important. If teachers invest time and energy into project-based innovations only to have their development prematurely curtailed by lack of organisation, struggles to take the affordances offered or project funding, this could undermine their future engagement with innovations. Within a decentralised educational system this can potentially damage the overall development of the system.

The teachers in this study demonstrate extraordinary levels of professional agency as they were able to take something positive from in-service training sessions, even if the training itself offered little. To expect this level from all teachers within a system seems to suggest an imbalance in the teacher-exosystem relationship, with the responsibility for innovation unfairly placed on the shoulders of teachers. This study, however, also points to ways in which positive interactions between the teachers and exosystem fosters the emergence (Daly *et al.* 2020) of innovations in ways that are suitable to particular teachers and communities. Successfully established innovations can then foster further innovations through modifications and practice. If educational leaders are also more aware of the need to coordinate opportunities for collegial collaboration through time as well as the affirmation of efforts, then innovations also seem more likely to become established parts of communities and spread further afield (Drew and Priestley 2019).

Another important theoretical consideration prompted by this study is how to conceptualise the temporal rhythm of different ecosystems. When teachers participate in in-service training or projects that are part of the exosystem, they temporarily 'step out' of the everyday routines and rhythms of their educational community. When these teachers return to their microsystem, and the innovation has to become part of the 'lived time' or habitual rhythm of the microecosystem (Vanderstraeten and Biesta 2006). The findings suggest that a disjuncture between the temporal requirements of the innovation and the habitual rhythm of the microsystem could disrupt the adoption of an innovation. Brofenbrenner and Morris (2007) expand the chronosystem to include microtime as (dis)continuity between ongoing episodes, mesotime as periodic episodes across intervals of time and macrotime as changing expectations and events in society. These temporal notions, however, do not address the ways in which temporal rhythms can differ between different ecosystems creating difficulties for educators as they work in multiple ecosystems. We consider this an interesting area for further investigation.

For the IKI project, this study is useful as it helps us to better understand what kind of relationships and activities can foster collaboration and innovation in a decentralised educational system. Moreover, this study highlights the need for projects to listen to the voices of participants and to provide a channel for the experiences and perspectives of teachers to be circulated in the wider circles of the ecosystem. We are aware, however, of the limitations of this study. Our reliance on interview data only provides a narrow perspective on the relationship between educators and the exosystem. A study in which participants maintained diary accounts in response to project activities would be another way of gaining insights into the ongoing negotiations between educators and the exosystem. It would also be important to conduct a study with teachers that resist innovations or struggle to respond to the demands of the decentralised system. Our next study addresses the ongoing formation of innovation within the microsystems of Finnish education. We hope, however, that the study reported here highlights the value of addressing the interconnectedness and temporality of between different ecosystems and the significant implications for the professional development of educators.

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