

Teacher Professional Agency in Curriculum Reform

Examining Finnish teachers' agency in the professional community

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Tiivistelmä - Referat - Abstract <p>Previous research indicates that teachers have a crucial role in the success of a curriculum reform. Teachers can be considered to be on the frontlines of curriculum reform in Finland, where a participatory strategy of reform implementation is employed. To respond to the challenges and changes within the reform, teachers can achieve agency within the professional community. Agency is defined as an object of teacher learning and is characterized by a teachers will, skills and efficacy beliefs for learning. Agency is considered contextual and relational, and it is continuously constructed and evolving. This study aims to examine variation of Finnish teachers' agency in the professional community within the context of large-scale national curriculum reform. Furthermore, this study aims to explore the relation between the experience of agency in the professional community and views towards curriculum reform and school development.</p> <p>This quantitative study examines a dataset collected from a representative sample of Finnish comprehensive school teachers. Data was collected in 2016 as part of a research project from 74 schools in Finland, representing urban and rural schools, smaller and larger schools as well as schools with a different socioeconomic index. The total number of respondents was 1531. The survey used two validated measures for professional agency and reform school impact in addition to background information on the teachers. Variation in experienced agency and the interrelations of agency and reform were examined using cluster analysis, discriminant function analysis, ANOVAs and Chi-square tests.</p> <p>Results indicate that the teachers could be grouped into high, medium and low agency clusters. Teachers in the low cluster were a pronounced minority. The experience of agency was similar through all clusters even if levels differed. Background variables did not contribute to the variation, but male teacher were found to be more likely to experience low agency. The teachers' agency also displayed a similar level of low collective efficacy across all clusters. Teachers with high levels of agency had a more positive view on the reform's impact. These results deepen the concept of teacher professional agency and offer new conceptual understanding into research on Finnish teachers as professionals.</p>		
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Tiivistelmä - Referat – Abstract Aikaisemman tutkimuksen perusteella opettajilla voidaan katsoa olevan tärkeä rooli onnistuneessa opetussuunnitelmauudistuksessa. Suomessa opettajat osallistetaan vahvasti opetussuunnitelmatyöhön. Muutoksen ja haasteiden edessä opettajilla on mahdollisuus saavuttaa ammatillisen toimijuuden kokemus työyhteisössä. Toimijuus ymmärretään tässä opettajan oppimiseen suuntautuvana ja koostuu motivaatiosta, pystyvyysuskomuksista ja oppimisen taidoista. Toimijuus nähdään kontekstisidonnaisena ja relationaalisenä, joka konstruoidaan aina uudelleen yhteisöissä. Tämä tutkimus pyrkii kartoittamaan toimijuuden kokemusta ammatillisissa yhteisöissä kansallisen opetussuunnitelmauudistuksen kontekstissa. Tutkimus tavoitteena on myös selvittää ammatillisen toimijuuden ja opetussuunnitelman uudistustyön sekä koulun kehittämisen välisiä suhteita. Tässä kvantitatiivisessa tutkimuksessa analysoitiin laajassa <i>Koululla on väliä</i> – hankkeessa kerättyä aineistoa. Aineisto edusti suomalaisia peruskoulunopettajia varsin hyvin. Vastauksia kyselyyn on 1531 opettajalta 73 koulusta. Koulut edustivat eri paikkakuntia, kokoja, koulutyyppisiä sekä sosioekonomista luokitusta. Kyselyssä käytettiin kahta aikaisemmin validoitua mittaria sekä opettajien taustatietoja. Toimijuuden kokemuksia ja toimijuuden ja uudistuksen vaikutusten arvioinnin yhteyksiä tarkasteltiin klusterianalyysin, erotteluanalyysin, varianssianalyysin sekä khiin neliö- testien avulla. Tulosten perusteella opettajat voitiin jakaa korkean, keskitason ja matalan toimijuuden ryhmiin. Matalan toimijuuden ryhmä oli selvästi vähemmistössä. Toimijuuden kokemus oli samankaltaista sen tasosta riippumatta. Taustamuuttajat eivät pääosin vaikuttaneet toimijuuden kokemukseen, mutta miespuoliset opettajat olivat vahvemmin edustettuina matalan toimijuuden ryhmässä. Opettajien kollektiiviset pystyvyysuskomukset näyttäytyivät toimijuuden heikoimpana osana kaikissa ryhmissä. Opettajat, jotka kokivat toimijuutta korkealla tasolla arvioivat myös uudistuksen vaikutukset myönteisemmin. Vastaavasti matalan toimijuuden ryhmän opettajien näkemys uudistuksesta oli kielteisempi ja vähemmän vaikuttava työyhteisön kehittämisen näkökulmasta. Tulokset syventävät tietoa opettajien toimijuudesta ja esittävät lupaavan käsitteellisen välineen tutkimukseen suomalaisesta opettajuudesta.		
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1 Introduction

When a new curriculum is drawn up and implemented, teachers have a crucial role in its success and impact in an education system. Curriculum reform has been studied from various viewpoints, for example by examining actors at a specific layer of reform (Salonen-Hakomäki, Soini, Pietarinen & Pyhältö 2016; Priestley & Biesta 2013), entire national or international education systems (see Sivesind, van den Akker & Rosenmund 2012), evaluation models (Sahlberg 2011) or implementation strategies (Pietarinen, Pyhältö & Soini 2017). For long, curriculum reforms have been understood as highly contextual (e.g. Kelly 1999). In current research, reforms exhibit complex and intertwined features across multiple layers and sites (Priestley, Philippou, Alvunger & Soini 2021). This study aims to focus on the teachers acting on the frontlines of curriculum reform, approaching them through agency in the professional community.

Curriculum reforms present a changing educational environment for teachers. This is especially true in Finland, where teachers are valued as professionals and have high autonomy in their work (Toom & Husu 2012; Sahlberg 2011). Teachers also participate in district-level initiatives, where the national core curriculum is worked into local curriculums (Pietarinen, Pyhältö & Soini 2019). Teachers can achieve agency in response to these challenging situations by using available resources and the context of their action (Priestley, Biesta & Robinson 2015). Agency is considered relational, where teachers see colleagues as resources for their learning and in turn support them (Edwards 2005). A teacher's agency is not considered an individual trait or capacity, but rather a intentional and creative effort to learn that is constructed in different educational contexts (Toom, Pyhältö & O'Connell Rust 2015). The achievement of agency evolves constantly within the professional community through learning (Toom, Pyhältö, Pietarinen & Soini 2021). Therefore, learning becomes the object of agency, constituting a teacher's will, efficacy beliefs and skills for learning (Toom et al. 2021). Agency involves a teacher's past personal and professional experiences and their beliefs and intentions about the future (Priestey et al. 2015). Agency is therefore important in constructing the kind of future a curricu-

lum directs a school or an education system towards. Teachers, who can be considered mediators of educational change through their practice (Kelly, Hohmann, Prat & Dorf 2012; Yang 2015) can drastically effect how the future is shaped. Additionally, any study of curriculums is not only concerned with learning outcomes or design, but also about “how to collaboratively bridge the gap between curriculum intentions and classroom practices throughout the multi-layered curriculum domain” (van den Akker & Nieveen 2021, pp. 48). Here, teachers are seen as actors of primary importance and teachers’ professional agency is again seen as a pivotal concept.

Even though “teachers as agent of change” is a much employed concept in policy speech, large-scale quantitative studies on the relations of teacher agency and curriculum reform are still relatively scarce. For example, teacher agency in reforms has been approached through teachers’ beliefs and views at the intersection of policy and practice (Priestley & Biesta 2013), teachers’ perceptions of the change process (Pyhältö, Pietarinen & Soini 2014) or teacher agency and identity (Tao & Gao 2017). To support the evaluation of the reform and to have a general perspective on the matter on a national level, this study addresses a gap in the literature concerning individual teachers’ experience of agency in the professional community in relation to how they evaluate the most recent reform. Past reforms have been studied from a similar perspective (see Pyhältö et al. 2014) but with a different design. The data used in this study gives valuable information on the reform implementation from the teachers, because at the time of data collection in 2016 the local curricula had been completed and their implementation had begun (Sullanmaa 2020). The teachers were therefore in a active phase of curriculum making and school development through teaching practices. The reform on the whole was launched in 2012 and continued to 2019.

Literature on teacher agency has grown steadily (see Cong-Lem 2021), arguably due to the influential theories formulated about it in recent years. The relations between curriculum reform impact from the teachers’ point of view and agency have not yet been explored in the context of the most recent reform in Finland. This study attempts to bridge together a gap in the literature consisting

mostly of qualitative studies on teacher agency and quantitative or mixed methods - studies on several aspects of curriculum reform and curriculum making. The aim of this study is to explore what kind of variation can be found in teacher agency in the context of curriculum reform. This is then tied to how the teachers evaluated the reforms impact and overall success. Previous research suggests that supporting teachers' agency in the professional community will improve reform efforts and inspire change (Ramberg 2014). This is realized through a supportive environment for learning and well-being at work (Pyhältö , Pietarinen & Soini 2015), which aids teachers in achieving strong professional agency.

2 Teacher Professional Agency

2.1 Defining agency in research on teachers

The concept of agency has been characterized as “slippery” (Priestley et al. 2015, pp. 19), “vague” (Toom et al. 2015, pp. 617) and “elusive” (Emirbayer & Mische 1998, pp. 962). Previous literature reviews on the topic agree on the diverse and sometimes narrow use of the concept (Priestley et al 2015; Cong-Lem 2021; Eteläpelto, Vähäsantanen, Hökkä & Paloniemi 2013). A common conception found in previous reviews is that teacher agency has often been used in research, policy talk, and workplace learning, but inadequately examined in empirical studies (Toom et al. 2021; Priestley et al. 2015; Eteläpelto et al. 2013) making it appear undertheorized (Cong-Lem 2021). There are currently; however, established theoretical stances and frameworks used by most researchers studying teacher agency (Cong-Lem 2021), perhaps contributing to the rising number of studies and reviews on the topic in recent years (see Cong-Lem 2021; Ruan, Zheng & Toom 2020).

The broader concept of agency has had a multifaceted and sometimes tumultuous existence since the Enlightenment (Eteläpelto et al. 2013). It has been employed extensively in sociology (for example in the works of Giddens and Archer), psychology (e.g. Bandura, Scardamalia and Bereiter), and various contemporary fields as diverse as organization management studies¹ and artificial intelligence². Some have argued if there is need to put so much effort into the concept of agency in the first place, for example denoting agency is an attribute that can be kept at hand to make sense of the social world (Fuchs 2001). In this view, “agency” is not a self-standing concept, but rather one end of a continuum (the other one being “structures”) to aid interpretation of social phenomena. Within the field of education, agency has been associated with stu-

¹ Miller, D., Le Breton-Miller, I., Minichilli, A., Corbetta, G. & Pittino, D. (2014) When do Non-Family CEOs Outperform in Family Firms? Agency and Behavioural Agency Perspectives. *Journal of Management Studies* 51(4).

² Chong, T., Yu, T., Keeling, D. I., & de Ruyter, K. (2021) AI-chatbots on the services frontline addressing the challenges and opportunities of agency. *Journal of Retailing and Consumer Services* 63.

dents, school leadership, social justice, and adult learning among other things as well as teachers.

Commenting on previous conceptualizations of agency, Priestley et al. (2015) present a distinction in the literature between agency as variable, agency as capacity, and agency as phenomenon. Emphasizing the latter two and in order to overcome a commitment to either an individualistic or a structure-centered view on agency, current theoretical stances bind the two together. In other words, teacher agency is not understood as a individual capability or purely from a cognitive viewpoint. Is it also not exclusively an issue of social structures or dynamics of power relations within professional contexts. In the most employed framework for example (Cong-Lem 2021), Priestley et al. (2015) draw on a temporal conceptualization of agency presented by Emirbayer and Mische (1998), where the achievement of agency consist of the way the past informs and influences actions, the patterns of action in the present and possible courses of action for the future. Here agency is viewed as a combination of individual matters such as beliefs and values, material and social resources and context of action (Priestley et al. 2015; Biesta & Tedder 2007). According to a recent literature review by Cong-Lem (2021), most researchers elect to combine different frameworks to conceptualize teacher agency. These approaches often include analytical division of teacher agency into its source, enactment, and achievement or outcome (Cong-Lem 2021). It seems that most of the literature agree on the intentional, contextual, and relational nature of teacher agency.

2.2 Teacher agency and teacher learning

As the focus here lies within the school and its changing instructional environment, this study follows an approach centered on teacher learning in line with previous studies on teachers' professional agency in Finland (e.g. Heikonen 2020). Teacher professional agency (TPA) is used as an integrative concept in the complex field of teacher learning (Pyhältö et al. 2014). In this approach, TPA integrates motivation, efficacy beliefs, and intentional action toward learning in professional communities such as classrooms (Pyhältö et al. 2015; Soini, Pietarinen, Toom & Pyhältö 2015). From the teachers' perspective, these ap-

pear as “motivation to learn (I want), self-efficacy beliefs for learning (I am able), and having and using the strategies for learning (I can and I do) in and from everyday pedagogical practice” (Heikonen, Pietarinen, Soini, Toom & Pyhältö 2020). Teachers are seen as the frontline actors in educational contexts, stressing the ability and efforts to navigate complicated situations through learning on an individual and relational level. TPA thus includes knowledge and the ability to cope with different situations depending on the ability to apply and adapt conceptual understanding in different contexts (Greeno 2006), although here knowledge and ability are not seen as a dichotomy of agency. It can also entail the capacity to tap into interpretations made by other teachers and align goals and ways of thinking towards joint problem-solving (Edwards 2010). Edwards (2010) has conceptualized this ability as relational agency. In the framework of this study, relationality is considered an attribute of TPA.

The quote above frames teacher agency in a way that emphasizes learning, relationships, and context. TPA is seen as active and intentional, meaning that rather than purely reacting to situations arising in their professional context, teachers act intentionally to manage their learning (Heikonen et al. 2020; Toom et al. 2021). According to Priestley et al. (2015) teacher agency is shaped by personal qualities and capacities formulated through past personal and professional experiences in previous contexts. For example, teacher education, past working conditions, or curriculums can greatly affect the achievement of agency (Priestley et al. 2015; Heikkilä, Iiskala & Mikkilä-Erdmann 2020; Soini et al. 2015). Teachers’ working environments can require unanticipated needs for learning and quick adaptation, as in the case of sudden extended online teaching during the COVID-19 pandemic, where agency in this sense on having motivation, skills and efficacy becomes paramount (Damşa, Langford, Uehara & Scherer 2021; Chabaan, Arar, Swalhi, Alhouti & Zohri 2021). From the perspective taken in this study, agency is considered a prerequisite of teacher learning and is oriented towards it - that is to say learning becomes the object of agency (Toom et al. 2021).

As agency is not viewed as a personal disposition or a fixed individual trait, TPA itself can be learned through teacher training and work experience (Heikonen et

al. 2020; Toom et al. 2015). This is based on the notion of teacher learning as situated and embedded in day-to-day professional activities and situations (Kwakman 2003). Therefore; TPA oriented towards learning and improving is meaningfully constructed in arising contexts during a teacher's engagement with activities relating to her profession (see Saariaho, Anttila, Toom, Pietarinen, Soini & Pyhältö 2018). Agentic teachers can take aspects of curriculum or prescriptive views on what to teach and modify them to suit their personal values arising from past experience and context (Jiang 2021). However, the concept of TPA is not prescriptive or normative by nature and does not include a stance on *what* teachers should learn (Toom et al. 2021). Instead, it is concerned with the *how* and (less frequently) the *why* of teacher learning. This is an important conceptual distinction, because some policy documents and consequently the research on those documents define agency based on outlined professional competencies (see Kangas & Harju-Luukkainen 2021). As Toom et al. (2021) note, TPA and teacher competencies are separate lines of research that can complement each other. A further articulation of teacher competencies vis-à-vis agency by Kelly et al. (2013) suggests, that competent teachers are not only skilled at specific areas of their work, but fully participating and contributing members of their communities of practice (Lave & Wenger 1991).

Learning in this situated and embedded sense refers to not only to individual teachers and their practices, but also the community of teachers, students, and the development of schools (Toom et al. 2021). Teacher agency is often viewed as an important factor in school development and educational change (Toom et al. 2015). Especially in cases where school reform or curriculum change has altered the status quo of a particular context, such as introducing a completely new subject or requiring new technical skills, TPA can be argued to be vital in order to achieve sufficient teacher learning and therefore facilitation of student learning (Scanlon & Connolly 2021). This has practical implications for this study, as the relations between curriculum reform in a national context and teacher agency are explored.

TPA can be seen as naturally tied to school reform as teachers' position on the new curriculum or any other changes affect their implementation or even their

success (see Pyhältö et al. 2014; Pešková, Spurná & Knecht 2019; Park & Sung 2013). In any case, teachers can be argued to mediate policy such as curriculum reform (Kelly et al. 2013; Yang 2015) instead of merely acting (or not acting) in the terms laid out by a curriculum. Achieving agency in the context of educational change can greatly affect how teacher's engage with the new curriculum (Tao & Gao, 2017).

In this short literature review, certain ways of viewing teacher agency in relation to school reform and curriculum change can be identified. There is notions of teachers' agency as resistance or opposition (Sannino 2010; Vaughn 2013). Teacher agency can also be viewed as complicated interplay between individual and context (Lasky 2005; Pyhältö et al. 2014). Here again, agency is constructed relationally, that is to say in interactions within the professional context of a school and the community surrounding it (Pyhältö et al. 2014). This study is concerned with the perceptions teachers have about the process of curriculum reform and their perceived sense of agency. Because TPA is defined as oriented towards learning, the professional community where teachers manifest or achieve agency becomes an essential context.

2.3 Professional agency in the professional community

In previous studies, the sense of professional agency in the professional community has been defined as “the quality and degree of the resources as well as skills and abilities to promote and manage learning“ (Toom, Pietarinen, Soini, & Pyhältö 2017, pp. 127), corresponding to the definition of TPA. Because TPA is considered highly contextual and relational, this entails managing learning on an individual level, but also in a collegial and collaborative sense. This therefore requires that teachers acknowledge and successfully construct a perspective of their colleagues and the professional community as a context, resources and motivation for professional development (Pyhältö et al. 2014).

Agency can be seen as temporal, with potential to develop with time through engaging in social activity (Priestley, Edwards, Priestley & Miller 2012). The sense of TPA begins to form during the very beginning of teacher education

(Toom et al. 2017) and continues to develop through the early-career phase of a teacher's professional life, where feelings of inadequacy and opportunities to reflect and learn from practice have to be shown to be influential (Heikonen 2020). Professional communities and individuals can be separated analytically (see Eteläpelto et al. 2013), but are intertwined in the socially constructed nature of TPA. For example, teachers can exercise professional agency in their professional community by influencing the working environment through co-regulative strategies (Pietarinen, Pyhältö, Soini & Salmela-Aro 2013; Pyhältö et al. 2015). This ties in to the concept of TPA, as co-regulation refers to using social resources (Pietarinen et al. 2013) and TPA in the context of professional agency can be seen as "a capacity to use interpersonal arenas as well as skills and abilities to promote and manage the learning of others" (Toom et al. 2017, pp. 128). Opportunities to engage in learning in the professional community can be seen as an important aspect of school development, curriculum implementation and fostering a sense of TPA from the perspective of teachers (Priestley et al. 2015; Ruan et al. 2020; Pyhältö et al. 2014).

TPA in the professional community could be determined with five latent factors (Pyhältö et al. 2015; Pietarinen, Pyhältö & Soini 2016):

1. Transforming teaching practices; (motivation to learn by seeing colleagues as resources to improve teaching practices).
2. Collective efficacy; (constructing a context of collaborative learning).
3. Positive interdependency; (recognizing taking into account others' learning in order to improve oneself and the professional community).
4. Mutual agreement; (agreeing on mutual concrete challenges and goals).
5. Active help-seeking; (finding resources in others to manage one's own learning).

3 Teachers and curriculum reform

3.1 Curriculum reform and the professional community

The field of curriculum inquiry has offered many definitions on the concept of curriculum. It has been approached through the tension between curriculum theory and practice, contextual points of view and topics relating to specific subject matter (Connelly & Xu 2010). Connelly & Xu (2010) note, that defining curriculum will be linked to the perceived purpose of education. Curriculums can be thought of as socially and historically constructed (Moreno 2006) and reflective of the views of the culture they are conceptualized in (Gilbert 2010). Van den Akker and Nieveen (2021) offer a practical definition aimed at facilitating curriculum development. Here, curriculum is thought of as a “design for learning” which includes the aims, content, activities, resources, location, social relations and assessments of students or learners in addition to the purpose of learning and the role of the teacher (van den Akker & Nieveen 2021, pp. 46- 47). An additional important element is curriculum coherence (van den Akker & Nieveen 2021), which has been shown to influence curriculum implementation as perceived by educational stakeholders including teachers (Sullanmaa, Pyhältö, Soini & Pietarinen 2019). As is the case with defining TPA in the previous chapter of this study, curriculum is defined in terms of its relationship to learning.

Reforming curriculums is often an issue of politics and its interests and power relations (Gilbert 2010; e.g. Sannino 2010). Curriculum reform can be represented on several levels roughly categorized into intended (curriculum ideals and vision; formal written curriculum documents) implemented (perceived curriculum and the actual operational processes) and attained (learners’ perspectives and outcomes) (van den Akker 2003). Several approaches to curriculum reform implementation have been identified, ranging from a top-down approach, which diminish teachers’ roles in development to bottom-up approaches enhancing dialogue between stakeholders (Gilbert 2010; Pietarinen et al. 2017). According to Soini, Pyhältö and Pietarinen (2021), curriculum reform in Finland has taken a participatory approach where educational practitioners as well as

students, parents and administrators collaborate and learn together with the goal of producing national guidelines and implementing the new curriculum at a local level. In practice, this process is led by the Finnish National Agency for Education and executed through working in groups comprising of educational stakeholders with feedback from the general public as well as educational professionals (Vitikka, Korkfors & Rikabi 2016; Soini et al. 2021). Rather than presenting a centralized and prescriptive curriculum, the curriculum reform of 2014 examined in this study attempted to balance individual subjects and their content with a general competency based approach, focusing on pedagogical development (Vitikka et al. 2016).

Finnish teachers are considered to have high autonomy in their work. This autonomy paired with a perspective of teachers as trusted professionals can be seen as an engrained aspect of several decades of systematic development of the Finnish education system (Sahlberg 2011). The national curriculum acts as a framework for the teachers' independent decisions regarding pedagogical practices and assessment (Toom & Husu 2012). This positions teachers as active participants in *curriculum making*. The term is employed in the field of curriculum studies as an analytical tool to examine curriculums as social practice (Priestley et al. 2021). In a review of previous theoretical approaches, Priestley et al. (2021) present curriculum making as typically viewed by layers or sites. These often include some differentiation between institutional and classroom levels. To distance theorizing from a hierarchical point of view, curriculum making is thought to occur in different sites by different social actors who have the ability to move between these sites. Institutions are also not confined to a particular level, but can participate and influence social practice in multiple sites (Priestley et al. 2021). These sites are named supra, marco, meso, micro and nano (van den Akker & Nieveen 2021; Priestley et al. 2021), ranging from transnational policy to classrooms where curriculums are made by teachers and students.

As the focus here lies with curriculum reform as a context from the teachers' perspective, this study is concerned with the micro and nano levels of curriculum making. Micro refers to developmental work undertaken at schools as

broader curriculums are made sense of at a local level. Nano can be seen as classroom interactions where student and teacher activity and the curriculum meet (Priestley et al. 2021). The question again becomes that of a teacher's professional community, where TPA is enacted in the context of curriculum reform.

3.2 Teacher roles in curriculum reform

In general, Finnish curriculum reforms, which occur roughly every 10 years, have maintained a systemic development of education policy that has been conservative towards international trends in curriculum and policy (Sahlberg 2011) such as outcome-based education or standard-based curriculums (Gilbert 2010). Internationally, past curriculums might have been thought of as restrictive towards TPA (Priestley et al. 2015), but it seems that in recent years curriculum reforms have played up the role of teachers as "agents of change" (Priestley et al. 2012; Ramberg 2014; Soini et al. 2021; Pantić, Galey, Florian, Joksimović, Viry, Gašević, Knutes Nyqvist, & Kyritsi 2021).

Previous research on the Finnish curriculum reform have found that teachers' perceptions of school development and their roles in it show interrelation. Pyhältö et al. (2014, pp. 313) categorized teacher perspectives of school development into holistic ("reflecting several interacting factors and procedures simultaneously") and atomistic ("perceiving only one factor or procedure"). Teachers can also think of themselves as an object of school reform, where participation in the reform is limited or a subject in school reform, who experiences a strong sense of TPA (Pyhältö et al. 2014). These identified perceptions yield four categories of teacher roles and perceptions: subject-holistic, subject-atomistic, object-holistic and object-atomistic (Pyhältö et al. 2014).

Pyhältö et al. (2014) showed that teachers' perceptions of reform shifted from atomistic towards holistic over time. Likewise, teachers' views of themselves as subjects increased as opposed to passive experience of being an object in the reform (Pyhätö et al. 2014). This facilitated and influenced the learning of TPA during the reform (Pyhältö et al. 2014). Although not in the context of the Finn-

ish school reform, an interesting observation comes from Ramberg (2014): If teachers perceive themselves as oriented towards change, it can be because the implementation of a new curriculum has affected their work, practices or perceptions of their teaching. This serves as a reminder of the issues of causality within this theoretical framework, i.e. it is not only the sense of TPA that affects curriculum implementation, but possibly also the other way around. Furthermore, as TPA is highly contextual, teachers can have a sense of professional agency as an approach to their work even if it is not achieved in a particular reform or change (Pyhältö et al. 2014).

The impact of curriculum reform is a topic with mixed viewpoints and results. There is a conception that sustained success in curriculum reforms is difficult and rare (see Gilbert 2010). Some studies have found positive effects on school development (Desimone 2013; M'mboga Akala 2021) or instruction in specific subjects such as mathematics (Li & Ni 2011; Moyer, Cai, Wang & Nie 2011). Sometimes curriculum reform has unintended consequences and effects, for example in the case of rising costs of exams for some students (Si 2021). The development work itself can both hinder and inspire TPA. A negative example could be a restricting culture of performativity; on the other hand the availability of relational resources within the school can foster a sense of TPA (Priestley et al. 2015). This study follows the definition by Sullanmaa (2020, pp. 16), where school impact "is understood as the extent to which the reform process facilitates sustainable and locally functioning school development". Within the Finnish curriculum reform, micro level actors have evaluated the school impact lower than those in the meso- or macro layers, making the experienced of sharing knowledge and managing change more negative in the micro layer (Soini et al. 2021; Sullanmaa 2020). Despite this, studies have found that most educational stakeholders hold positive expectations of school impact about the national curriculum (Sullanmaa 2020; Sullanmaa, Pyhältö, Pietarinen & Soini 2019). This study is concerned with the perceptions teachers have about the impact of the new national curriculum and its development. Therefore the concern is not with measuring impact of the reform in terms of the attained representation of the curriculum, but rather the relations between perceived TPA and school impact as evaluated by the teachers. In other words, this study is positioned in the

implemented level of curriculum representation, more specifically dealing with the perceived curriculum (see van den Akker 2003).

4 Aim of the Study

This study aims to deepen the understanding of teacher professional agency in the professional community in the Finnish national curriculum reform. Previous research has indicated that teachers' perceptions of their roles in the reform position them differently in relation to educational change. TPA has been found to vary in educational reforms both in Finland (Pyhältö et al. 2014; Heikonen 2020) and in countries all over the world, such as Scotland (Priestley et al. 2015), Norway (Ramberg 2014), Canada (Lasky 2005) and China (Tao & Gao 2017). In the context of curriculum reform, TPA has been studied through various viewpoints, such as teachers' beliefs (Priestley et al. 2015), teacher roles (Pyhältö et al. 2014) or teacher identity (Tao & Gao 2017). This study aims to explore the relationships between perceived TPA and school impact as well as the teachers' views on the curriculum reform process, which has not been examined within the most recent Finnish reform of 2012-2019. The following research questions were addressed:

1. What kind of variation concerning teachers' experience of professional agency in the context of the Finnish national curriculum reform can be identified?
2. How is the experienced agency related to the curriculum reform process and school impact as evaluated by the teachers?

5 Method

Most studies of teacher agency employ qualitative methods due to the complexity of the phenomenon (Pantic et al. 2021). A variety of approaches and design have been used to explore Finnish teachers' agency, including narrative analysis (Heikkilä et al. 2020), document sources research (Kangas & Harju-Luukkainen 2021) and phenomenological approaches (Koskela & Kärkkäinen 2021). However, only a few large-scale quantitative studies have been carried out on the topic so far. In addition, relatively few measures focusing on agency have been developed in previous research literature. The data used in this study was collected in a national research project called "School Matters"³ (*Koululla on väliä*) led by K. Pyhältö, T. Soini and J. Pietarinen and funded by the Ministry of Education and Culture between 2013 and 2019.

5.1 Research context

Finnish curriculum reforms can be traced back to around 1970, when two previously parallel education systems in place were centralized (Vitikka et al. 2016). Curriculum reforms have been undertaken since then approximately every 10 years. In the reform, the Finnish National Agency for Education involves stakeholders like municipalities, researchers, school administration and teachers in work on the core curriculum (Sullanmaa et al. 2019). This core curriculum is then used to develop local curriculums in school districts, which involve the municipality and the local schools (Pietarinen et al. 2019).

This study examines the most recent reform of 2014. Teachers play a critical role in curriculum reform implementation, as Finland employs a participatory strategy (Soini et al. 2021) using a top-down-bottom-up approach (Pietarinen et al. 2017). Districts, individual schools, and teachers are highly trusted in Finnish society (Toom & Husu 2012) and have considerable autonomy in curriculum making at a local level (Soini et al. 2021). Teaching is considered a highly val-

³ See <http://www.learninginschool.fi/>

ued profession in Finland, and entry into teacher education at universities remains very competitive (Toom et al. 2017; Heikonen 2020).⁴

5.2 Data collection

The data collection employed a nested strategy with three phases. In the first phase, six school districts were selected based on location (urban-rural) and size of reform stakeholder networks. Then, profiles were created for these schools (N=303) based on SES indicator data. SES refers to a model for socio-economic data that takes the level of education (higher-basic), median income, median household income, and unemployment statistics of the residents into account. These statistics were provided by Statistics Finland (2013). The third phase consisted of calculating an SES score for each school and selecting the school in the upper and lower quarters of the distribution for the final sample. 122 schools were contacted to participate in the study (Pietarinen, Pyhältö, Haverinen, Leskinen & Soini 2021).

5.3 Participants

This study examines a portion of a dataset collected in 2016 from comprehensive school teachers (Grades 1-9) (N=1531). The data was collected by the research team members during teacher staff meetings. The teachers had the option of declining to participate in the survey or returning the survey by mail in case they were absent from the original meeting. The teachers were given details about the study and their rights as participants. They were also informed about the management and storage of data before the survey was given. Participation was voluntary, and no incentives were used. They also had the option of remaining anonymous (see Pietarinen et al. 2021).

The teachers responding to the survey worked at 74 different schools. The total number of responses to the survey was 1531, corresponding to a response rate of roughly 80 % (see Sullanmaa 2020). In the sample selected for this study,

⁴ For recent figures see VAKAVA (2020) VAKAVAAn osallistuneiden koulutusten hakemusmäärät ja pisterajat 15.7.2020.
https://www2.helsinki.fi/sites/default/files/atoms/files/vakavaan_osallistuneiden_koulutusten_hakemusmaarat_ja_pisterajat_15.7.2020.pdf

76% of the teachers identified as female and 23% male, displaying the same overrepresentation of female teachers present in previous studies (see Pyhältö et al. 2015; Pietarinen et al. 2013). The sample displayed a wide range of experience, including early-career teachers with under a year, as well as very experienced teachers with over 40 years of teaching experience. The average amount of teaching experience in the sample was 15 years.

Comprehensive school teachers refer to primary school teachers, subject teachers, and special education teachers. Finnish teachers are required to have a five-year master's degree either in education (for primary school and special education teachers) or their taught subject with additional pedagogical studies of 60 credits. 52% of the teachers in this study worked at a primary school, 17% at a lower secondary school, and 30% at a unified comprehensive school with both age groups. The difference between teaching practices is that, typically elementary school teachers will have most of their classes with the same group of students whereas subject teachers teach one or more subjects to several groups (Pietarinen et al. 2021).

5.4 Measures

Two validated scales, one for measuring TPA and another for measuring school impact were utilized in this study (see Pyhältö et al. 2015; Pietarinen et al. 2016; Toom et al. 2017; Soini et al. 2015; Pietarinen et al. 2017; Sullanmaa 2020):

1. Teacher professional agency in the professional community (15 items)
2. Curriculum reform school impact (6 items)

Drawing on the theoretical formulation of TPA, the first scale measures the integrated aspects of TPA: motivation to learn, efficacy beliefs about learning, and intentional learning management. The scale consist of five factors: transformative practice (4 items), collective efficacy (4 items), positive interdependency (3 items), mutual agreement (2 items), and active help-seeking (2 items) (Pyhältö et al. 2015; Pietarinen et al. 2016; Toom et al. 2017).

The second scale is a part of the more extensive curriculum reform inventory developed to measure curriculum coherence and school impact (Pietarinen et al. 2017). The school impact section has 6 items measuring perceptions of development at schools in curriculum reform (Sullanmaa 2020). Both scales used a rating on a 7-point Likert scale (1= completely disagree – 7= completely agree). The survey also asked respondents to rate the overall success of the curriculum reform. This item was included in the school impact section of data analysis for this study.

In addition to these scales, the data contains information of the respondents gender, teaching experience, school size and type, and SES index. These data were used to address the first research question in addition to the TPA measure.

5.5 Data analysis

Before the main statistical analyses were conducted, descriptive statistics were calculated using SPSS. To address the first research question, sum variables and reliability statistics were calculated for TPA and school impact. The measures have been employed in studies (e.g. Pyhältö et al. 2015; Pietarinen et al. 2016; Sullanmaa et al. 2019) based on previous theoretical and empirical formulations; therefore, no confirmatory factor analysis was conducted. This also enables the comparison of results of this study to others using the same five factor division of TPA. Cronbach alpha values for all the sum variables were acceptable. However, the Cronbach alpha values for mutual agreement (0.638) and active help-seeking (0.623) can be considered unsatisfactory (Hinton 2004; Hair, Black, Babin & Anderson 2010). This will be elaborated in the section concerning reliability of this study. As there was no instance where deleting an item from the sum variable would have increased the Cronbach alpha value, the variables were constructed according to previous studies.

Next, skewness and kurtosis of the distribution of the variables were examined. Tests for normal distribution tend to reject assumptions of normality quite easily with large samples (Metsämuuronen 2011; Field 2009). Both a visual ex-

amination and statistical tests showed that the variables were not normally distributed. Therefore, the analyses were confirmed with non-parametric tests. Results for both were similar in all cases, so the results from parametric tests were reported. Correlations between the variables were examined using Spearman's rho, which is suited for variables that violate parametric assumptions (Field 2009).

To address the first research question, k-means clustering technique was used to identify variation in teachers' perceptions of TPA. Since all the variables were continuous, a one-way ANOVA-analysis and a Kruskal-Wallis test could be used to confirm differences between clusters and search for significant variation. A p value of $<.05$ was considered statistically significant. The variables were all measured on a scale of 1-7 and did not need to be standardized for the analysis. To determine the appropriate number of clusters, the grouping was done in two steps. Although Metsämuuronen (2011) notes that hierarchical clustering is less suited for very large sets of data, it was conducted first in order to have a preliminary cluster solution using squared euclidian distance and Ward's method. Ward's method was chosen for its tendency to produce equally sized clusters (Hair et al. 2010). Because of the size of the dataset, hierarchical clustering was done on a random sample generated by SPSS from the data. Hair et al. (2010) suggest that in order to maximize the validity of the cluster solutions, the analysis could be run multiple times. This was done twice with different random subsets of the data, with both constituting 25% of the original dataset. The hierarchical clustering yielded 2 clusters as the best solution. To confirm the validity of the solution, the cluster memberships of the hierarchical clustering on the entire dataset and a k-means clustering with 2 set clusters were cross-tabulated (see appendix 1). While the first cluster had most of the observations placed within it by both methods, the second cluster in the k-means solution was clearly split into almost equal halves (45% and 55% respectively by the hierarchical method). Because of this, the second cluster was interpreted to form two distinct clusters, bringing the solution up to 3. Since hierarchical clustering is sensitive to clusters that have been already formed and is not able to move observations from one cluster to another (Hair et al. 2010), k-means clustering was conducted for the final solution with 3 clusters. The clustering algorithm chosen was the optimizing

algorithm in order to achieve minimal heterogeneity between clusters (Hair et al. 2010).

The significance of the differences in the variables of TPA within the clusters was determined by conducting a one-way Anova. A Levene test and a Brown-Forsythe test showed that the difference in variance between clusters was statistically significant. This can occur due to the large sample size (Field 2009), and according to Metsämuuronen (2011), the Levene F-test can be considered reliable even when assumptions are not met. Tahmane's test was used in Post Hoc-analysis. Effect sizes (r) were calculated with eta squared (η^2) (Field 2009). To examine the role different aspects of TPA have in differentiating the clusters, a discriminant function analysis was conducted. Wilks' lambda test was used to find combinations of variables that significantly discriminate the groups. Canonical correlation coefficients were then used to find out which variables contribute most to the differentiation. Finally, group centroids were examined to see which of the clusters were discriminated by the variables (Field 2009).

To explore the relations of TPA and school impact, a one-way ANOVA analysis and a Kruskal-Wallis test were carried out. Both tests showed similar results, so parametric results were reported. The Levene test for homogeneity of variance showed a significant result for school impact but not for overall reform success rating. Therefore, Tahmane's test was used for the school impact variable and the Bonferroni correction for the overall reform success rating variable in Post-Hoc analysis.

Besides the groups identified for the first question, the teachers' gender, teaching experience, school type, and SES index were also used to examine differences in perceived TPA in relation to the curriculum reform. This was done using the chi-square test for the categorical variables of gender, school type, and SES index. To further examine the differences between groups in the chi-square test with a significant result, confidence intervals were calculated for frequency of each category in each cluster (see appendix 3). A one-way ANOVA was used for the continuous variable of teaching experience in years.

6 Results

6.1 Initial analyses

A MACR test was conducted to examine missing values. The test showed a significant result. Since there were relatively few missing values ranging only between 0.6 and 2.9 percent, and due to the cross-sectional design of this study, no further steps were taken.

All variables were rated above the halfway point of the scale by the teachers, which infers that overall they experienced and acted agency in the context of curriculum reform. All variables in the TPA measure had similar means. School impact and overall reform success were rated slightly lower. However, the scores were the most dispersed for the overall reform success variable.

Table 1. Sum variables and their Cronbach alpha values, means, standard deviations, ranges and number of respondents.

Variable	α	M	SD	Range	N
Transformative Practice	0.845	5.6	0.87	2-7	1522
Collective Efficacy	0.805	5	0.96	1-7	1521
Positive Interdependency	0.764	5.5	0.88	2-7	1522
Mutual Agreement	0.638	5.7	1	1-7	1521
Active Help-seeking	0.623	5.7	0.96	1-7	1522
School Impact	0.904	4.4	0.98	1-7	1546
Overall reform success		3.8	1.3	1-7	1541

All the variables showed statistically significant correlation with one another (all at $p < .001$), which is not unusual with large samples. There were no negative correlations and there was a noticeable disparity in the correlation coefficients. Citing Cohen (1988), Miles and Banyard (2007) divide coefficients into small (.10), medium (.30) and large (.50). Regarding TPA, large correlation coefficients were found between all the variables except for active help seeking and

mutual agreement (.38). The highest correlations were with positive interdependency and transformative practice (.65) as well as positive interdependency and collective efficacy (.61). The reform impact variables displayed small to medium correlations with the lowest being between overall reform success and active help-seeking (.15) as well as overall reform success and mutual agreement (.16). The coefficient between school impact and overall reform success was high (.67).

Table 2. Correlation matrix of the variables.

Variable	1	2	3	4	5	6	7
1. Transformative Practice	-						
2. Collective Efficacy	.511**	-					
3. Positive Interdependency	.655**	.615**	-				
4. Mutual Agreement	.520**	.502**	.498**	-			
5. Active Help-seeking	.453**	.597**	.578**	.379**	-		
6. School Impact	.295**	.453**	.325**	.277**	.277**	-	
7. Overall reform success	.214**	.305**	.238**	.161**	.151**	.666**	-

** p<.001

6.2 Relationships and groups in experienced TPA

Based on the answers to the TPA survey, the teachers could be placed in three groups whose means are statistically significant from each other. There was variation in cluster sizes, with two of the clusters being over 600 observations and one being much smaller with 223. The means of each cluster showed that there was a clear divide in the teachers' responses. The clusters could be placed in a descending order with all variables rated in a similar manner. The teachers rated collective efficacy, which emphasized the teachers' communal responses to work and development the lowest in every cluster. The clusters were named high, medium and low TPA clusters.

Table 3. Means, F-values, statistical significance and effect size for TPA variables in each cluster.

Variable	Cluster			F	p	r
	High	Medium	Low			
	(N= 659) M	(N=638) M	(N=223) M			
Transformative Practice	6.24	5.49	4.45	736.37	<.001	0.701
Collective Efficacy	5.76	4.81	3.67	960.34	<.001	0.747
Positive Interdependency	6.20	5.26	4.24	1131.86	<.001	0.805
Mutual Agreement	6.41	5.59	4.39	657.16	<.001	0.681
Active Help-seeking	6.43	5.55	4.46	733.68	<.001	0.702

all means differed at the $p = .001$ level

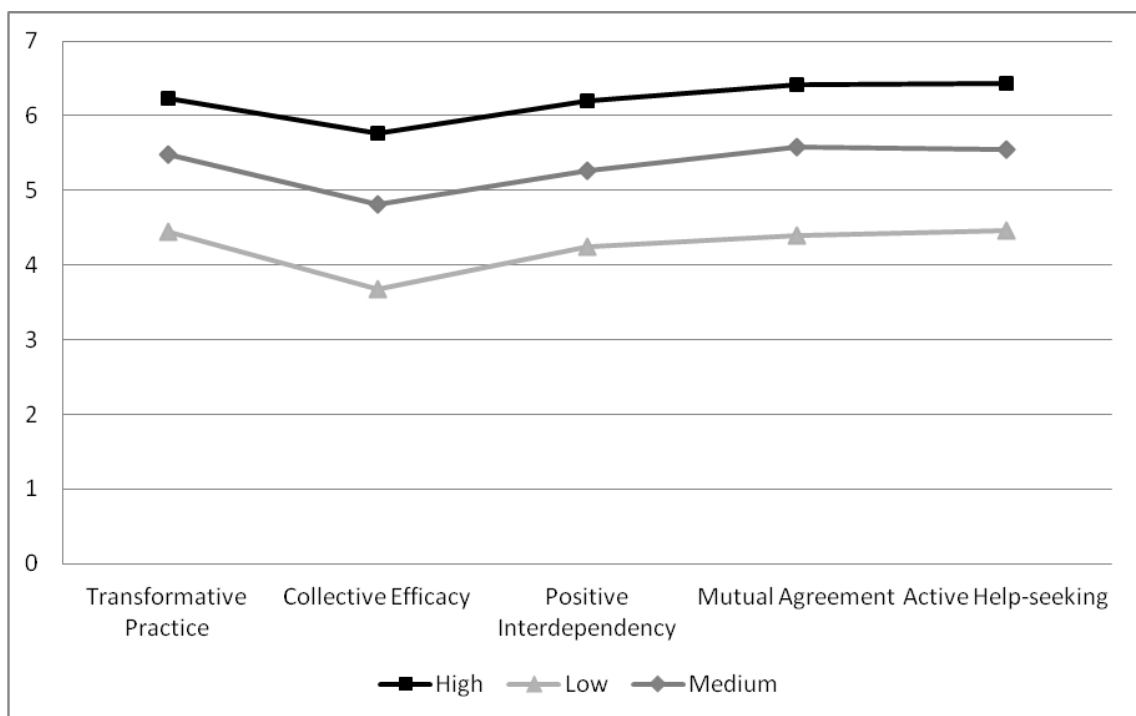
The majority of teachers could be considered agentic, since 85% of the teachers would be in either the high or medium TPA groups. Two discriminating variates could be identified based on the discriminant function analysis, although the first of these accounted for almost all of the variance (99%). However, Wilks's Lambda test showed that both variates discriminating the groups were statistically significant at the $p < .05$ level (see appendix 2). Because of this, the results concerning the second variate should be considered carefully. It is possible that the statistical significance was due to the large sample size instead of an actual effect on the differentiation in TPA.

Mutual agreement and active help-seeking were the most important for the first variate, implying that a teacher's sense of common rules and ability to work together with colleagues might be an important separator between clusters. For the second variate, positive interdependency had the highest coefficient, but the value was negative. Examination of the group centroids showed that the first variate which emphasized mutual agreement and active help-seeking discriminated teachers between the first cluster (high) and the other two. The second variate, which emphasized positive interdependency discriminated the third cluster (medium) from the rest. Positive interdependency includes aspects of agency where an individual utilizes feedback from the community and acts with the community's best interest in mind. This can be thought to represent a

teacher's ability to experience agency both as an active member of the professional community and as an individual.

A further examination of the means of each variable supports a conclusion that teachers in this sample experience agency in a similar manner but to varying degrees. First, mutual agreement and active help-seeking have the two highest means in all clusters. Transformative practice was in the middle and positive interdependency and collective efficacy were rated lower across all clusters. The difference between the clusters comes from the degree to which these factors of TPA are experienced (see figure 1).

Figure 1. Means of each TPA variable across all clusters.



6.3 Background variables and cluster membership

For all the background variables included (gender, school type, SES index and teaching experience) only one displayed a statistically significant result. The relation between the cluster membership and a teacher's gender was significant, $\chi^2 (2, N = 1411) = 18.5, p < .001$. Proportionately more male teachers were grouped into the low TPA cluster (20% percent of all male teachers versus 12%

of all female teachers) and more female teachers into the high TPA cluster (47% of all female teachers versus 36% of all male teachers).

Table 4. Frequencies of gender in each cluster, expected frequency in parentheses and percentages in each cluster.

		Cluster			Dataset
		High	Medium	Low	
Gender	Female	503 (476) 80.5%	442 (449) 75%	129 (149) 65.8%	1074 76%
	Male	122 (149) 19.5%	148 (140) 25%	67 (47) 34.2%	337 24%
Total		625 100%	590 100%	196 100%	1411 100%

For the school type variable, the proportion of teachers did not differ by cluster $\chi^2 (4, N = 1520) = 8.7, p < .069$. The test for SES index and the clusters also showed that there was no significant association $\chi^2 (2, N = 1520) = 2.5, p < .292$. No significant relationship was found between teaching experience and cluster memberships, $F(2, 1498) = 1.83, p < .160$.

6.4 TPA and curriculum reform impact

There was a significant result of school impact at the $p < .001$ level for all of the clusters, $F(2, 1507) = 112.02, p < .001$. The result for overall reform success rating was also significant $F(2, 1503) = 50.75, p < .001$. Post Hoc comparisons using Tahmane's test for the school impact variable and the Bonferroni correction for the overall reform success rating variable indicated that means were significantly different for all clusters. This suggests that teachers who experienced and acted agency in the curriculum reform felt that the reform was more impactful and had more success.

The means for school impact were higher than those of the overall reform success rating in all clusters. This seems to imply that when asked about the impact of the reform on developing practices, the school community and problem-

solving at a local level, the teachers had a more positive view of developing the new curriculum (see Sullanmaa 2020, pp. 30). This way of thinking about development work perhaps made teachers more aware of their own contribution and ownership in the reform. These aspects of curriculum making concerning teachers have been found to be important to successful implementation (Pietarinen et al. 2017; Priestley et al. 2015). The simple question of rating the overall success of the curriculum reform might have positioned more teachers in a passive way, perhaps as objects of the reform instead of subjects in it (see Pyhältö et al. 2014).

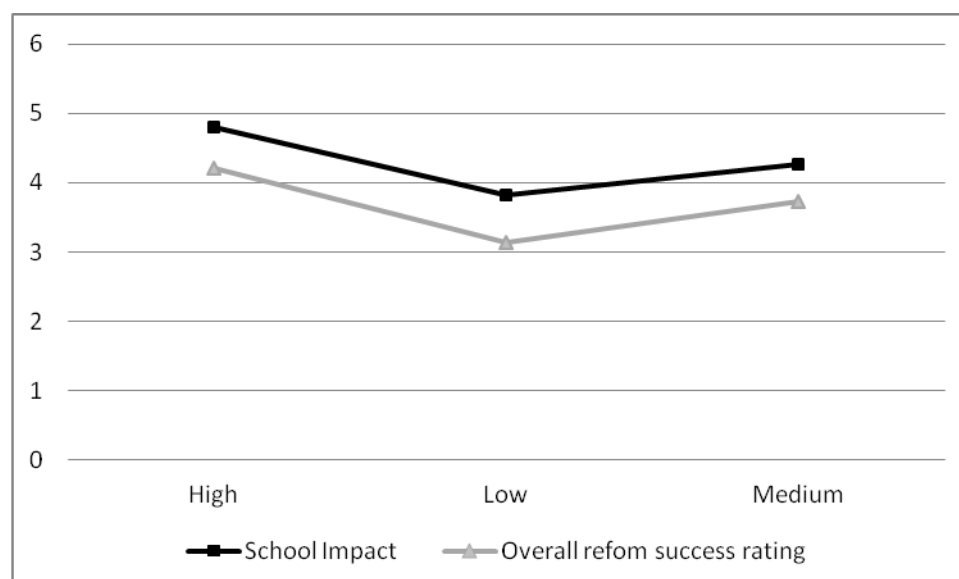
Table 5. Means, F-values, statistical significance and effect size for school impact and overall reform success rating in each cluster.

Variable	Cluster			F	p	r
	High M	Low M	Medium M			
School Impact	4.80	3.82	4.26	112.02	<.001	0.359
Overall reform success rating	4.21	3.14	3.72	50.75	<.001	0.250

all means were statistically significant at the $p=.001$ level

As with the experienced TPA, evaluation of the reform clearly follows a similar trend across all clusters.

Figure 2. Means of both curriculum reform evaluation variables across all clusters.



7 Results

7.1 Reliability and validity

The main issue with surveys measured on a Likert scale is that it is often treated as an interval scale even though the points on the scale cannot be considered relative to each other (Tuckman & Harper 2012). The statistical analyses in this study treated the variables as interval even though they could be rather considered ratio (Field 2009). This study can therefore not be certain what exactly the teachers meant when answering or if they had the tendency to pick medium answers. However, the ranges of the answers showed that the scores were quite dispersed with a wide range and that there were sufficient amounts of different answers. The use of sum variables of multiple items also somewhat overcomes the issue of scale (Tuckman & Harper 2012).

Validity in this study was approached from the viewpoint of construct validity. It refers to how well the measures used represent the construct being measured (Field 2009). The validity of the measures could be considered a strength of this study, since established and validated measures were used. The sum variables were formed in accordance with previous studies. This was seen as a necessary step, because previous literature showed that the concept of agency remains fluid and open to interpretation. In other words, the way agency is understood is certain to affect the way it is thought to be best measured. This study used a definition and conception of agency within an ongoing line of research in Finland, where teacher learning is seen as a central binding concept.

The external validity or representativeness of this study can be viewed through the sampling strategy. Tuckman and Harper (2012) give an example of an experiment with students in an urban part of a country which might not be applicable in a rural part of the same country. The data used in this study was collected as part of a large-scale research project with a nested sampling strategy (Pietarinen et al. 2021). Because of the SES-index (almost equal low-high ratio), the amount of respondents and the geographical location of the schools, the data can be thought to represent Finnish comprehensive school teachers well.

The data also had teachers from very small schools all the way to large ones. The relatively high response rate adds to the confidence in the ability to generalize findings nationally.

The reliability of the scales was examined using Cronbach's alpha values. The transformative practice and collective efficacy variables had strong alpha values of .845 and .805, respectively. Positive interdependency also had sufficient alpha value of .764. The factors for mutual agreement and active help-seeking, which were integral to the interpretation of the results in this study only consisted of two items. This was the likely cause for the lower alpha values found for these factors. In an earlier study with the same measures, Pyhältö et al. (2015) call for further validation of the TPA measure in other school systems and countries.

Cluster analysis can be criticized for "working too well" (Hair et al. 2010, pp. 509), i.e. by identifying clusters even if there is no actual structure in the data. Therefore, cluster analysis should perhaps be considered more of an exploratory technique. Furthermore, the formation of the final cluster solution relies on interpretation of the analysis and is therefore very subjective by nature (Hair et al. 2010). Taking this into consideration, the results of this study should be seen as dealing with Finnish teachers' experience of different levels of TPA, rather than give too much meaning to the actual clusters formed. The results showed general trends and scope of TPA in relation to school reform. More nuanced clustering techniques, such as latent profile analysis could be used to attain more refined results. Additionally, no profile of a single person can truly denote them as more or less agentic. Edwards (2015, pp. 781) points out, that research cannot get to the true intentions of an individual but only the surface of agency; that is "we can, at best, access the actor as a 'person' as they interpret, negotiate, resist and so on, we cannot access the 'self'".

7.2 Ethical considerations

The premises and guidelines of responsible conduct of research were followed in this study (Finnish Advisory Board on Research Integrity 2012). Participation in data collection was voluntary for the teachers and there were no incentives.

Research permits were acquired from the schools and the Department of Education. Teachers could remain anonymous and they were given information about their rights as participants before the survey was given. As this study did not require any personal information from the teachers, it was not included in the dataset used for the analyses. During the research process, the data was stored and handled appropriately and securely.

7.3 Conclusions

This study examined Finnish teachers' experience of TPA in large-scale curriculum reform. Based on the analyses the teachers can be grouped as follows:

1. Teachers, who experience high levels of TPA and act agentically within the professional community. These teachers tend to view the reform as more impactful and successful than those with lower experience of TPA.
2. Teachers, who experience lower levels of TPA, especially regarding collective efforts within the professional community. The teachers who experienced lower agency also had an unfavourable view on the curriculum reform.
3. Teachers, who experience reasonably high levels of TPA. They also rated the success and impact of the curriculum reform at a medium level compared to the other groups.

There are several things to consider with reasons for this type of variation in TPA in curriculum reform. TPA has been found to change over time, specifically from object of the reform to subject in it (Pyhältö et al. 2014). Pyhältö et al. (2014) also concluded that teachers' views on themselves are quite consistent and resistant to change. If teachers are deprived of opportunities to be actively involved in development of the school and the professional environment, presumably their agency can be hindered. Based on previous studies e.g. Pešková et al. 2019; Park & Sung 2013), it is possible that the teachers grouped into the low TPA cluster in this study experienced such a lack of opportunities for development. It can also be that an individual teacher's beliefs are inconsistent with

the professional community or the curriculum, resulting in an inability to achieve agency (Vaughn 2013). International studies relate these phenomena to for example an overemphasis on standardized testing and “teacher-proof” curricula (Vaughn 2013; Priestley et al. 2015) or failure to engage teachers in reform implementation (Pešková et al. 2019), both of which are seldom considered problematic issues in the Finnish education system (see Sahlberg 2011; Pietarinen et al. 2017). This dataset, however, did not include further questions on participation in development work or initiatives and no such conclusions can be made here.

Another aspect of the causes for variation are the integrated components of TPA: the will, the skills and the efficacy beliefs for learning. This study suggests that the sum variable of collective efficacy was a weak aspect in all clusters. Transformative practice, which approaches the motivation and willingness to engage with the learning community and share ideas with others, are a strength of Finnish teachers’ TPA. In other words, the experience of agency remained similar across all groups even if the levels were different. Finnish teachers did not display variation according to age, school type or socio-economic indicators. This presents Finnish teachers on the whole as a coherent profession in terms of TPA in curriculum reform, placing highly agentic teachers as more positive towards development efforts and their impact. Pietarinen et al. (2016) note, that it is important to consider all of these aspects for achieving TPA within any context. In the face of such uniformity, it might seem conceivable to search for a behavioural attribute that had the power to explain why some teachers are more motivated, possess more skills or higher beliefs of efficacy towards learning. However, previous studies have shown the impossibility of reducing TPA in such a manner (Pyhältö et al. 2014; Pietarinen et al. 2016).

According to Toom et al. (2021) agentic teachers can be characterized as accountable for their own and their colleagues learning as well as being active in finding ways to support such learning. They also take initiative in learning within their professional context (Pietarinen et al. 2016). Based on the results of this study, agentic teachers have more positive views on how the work to reform the curriculum commits teachers and maintains active development. Causality can-

not be determined in this respect, but it seems that having faith and an optimistic outlook on the reforms ability to direct development work in a meaningful way is intertwined with an active attitude towards learning in the professional community. Because previous research has focused on other aspect of a teacher's professional identity, beliefs or roles in reform, this result can be considered an extension of current theoretical knowledge of TPA as it presents an aspect that has previously not been addressed in research literature. The important question for successful reforms then becomes: how to achieve agency in practice?

7.4 Practical implications

The teachers in all groups valued agreeing on common rules and practices as well as helping other teachers and discussing challenging situations together. However, feelings of mutual development and dealing with challenges together were not experienced at a high rate in any of the groups. Here, managing each others' learning (Toom et al. 2017) can be seen as an important aspect of Finnish teachers' agency. Yet, they seem to feel that mutual efforts and help are not successful in their experience of agency. One possible reason for this is the high autonomy of Finnish teachers, which can isolate them in the face of challenges (Kokko, Takala & Pihlaja 2021). This view is supported by the low levels of feedback or impact of feedback on their teaching practice reported by Finnish teachers compared to other countries in the TALIS-study (OECD 2019). In cases, such as one presented by Park and Sung (2013), where teachers feel they are left alone to face challenging situations, they seem to feel indifferent and resistant towards reform and development initiatives. TPA is often applied in studies to refer to proactive and development-oriented teachers (see Pantić et al. 2021). Finnish teachers could be considered agentic in the sense that they take initiative in actively developing the school and its practices, but that these collective efforts don't reach teachers facing challenges in their work.

The concept of teacher professionalism makes high demands of an individual teachers concerning planning, implementation, evaluation, research based knowledge and school development (Lavonen, Korhonen & Juuti 2015). Although Finnish teachers are encouraged to collaborate with other teachers and

their school community (Toom & Husu 2012) and have positive views on collaborative elements such as co-teaching (Kokko et al. 2021), these findings position collective efficacy as an element to be addressed and improved in Finnish teachers' professional communities. Kunnari, Ilomäki and Toom (2018) have examined collective efficacy in teacher teams. They found that building new teaching practices, often ones that are student-centered, enhanced efficacy beliefs. Teams of teachers should also be able to act flexibly and react to emerging challenges together. When challenges are solved, teachers' efficacy beliefs are heightened. The implications of this are that Finnish teachers seem to construct their agency within an individual mindset, and more ways to incorporate collective problem solving would be beneficial in challenging situations arising from curricular reform. These challenges can be connected to the reform on an individual level, as Finnish teachers are responsible for decision regarding materials, methods and assessment framed by the curriculum (see Kumpulainen & Lankinen 2016). These results and conclusions present a novelty in the conceptual understanding of TPA in Finland. The teaching profession, and what it is to *be a teacher*, has been extensively studied. However, no connections between TPA and the mentality and mindset of Finnish teachers in professional communities have been made in previous research literature. Research on TPA in this respect seems to have potential as a salient conceptual tool in exploring development work undertaken in teachers' professional communities.

Overall, the teachers in this study reported a strong level of agency. Those that reported a low level of TPA were clearly a minority. This can be discussed in connection with the participatory reform strategies used in Finland, which involve building a sense of ownership of the reform (Soini et al. 2021). In this study, agency is seen as embedded in the professional community (Pyhältö et al. 2014). Teachers with a strong sense of TPA in the context of the curriculum reform and who have a positive view of its impact, can take responsibility for implementation and collaborative efforts to develop and learn in the professional community. This would increase a sense of ownership and knowledge sharing. Implementation strategy has been shown to facilitate collective learning and perceptions of positive school impact (Pietarinen et al. 2017; Tikkanen, Pyhältö, Pietarinen & Soini 2019). This would suggest that the reform strategy taken has

fostered a sense of TPA, where most of the teachers felt they have the will, efficacy and skills to direct their learning in a meaningful way in accordance to the curriculum reform (see Toom et al. 2021).

7.5 Implications for future research

The teachers in this study could be argued to have a clear professional orientation, in which others can be seen as resources for their own learning (see Pyhältö et al. 2015). They also display motivation to listen to feedback from their colleagues and be inspired to develop their teaching practice. This cross-sectional data does not go deeper into the reasons why the teachers felt less successful in actually constructing such a frame of mutual learning in the professional community. Further enquiry into this would be needed in the future, possibly using a mixed methods approach and a longitudinal design. This would give the opportunity to include interviews as well as quantitative data to further the knowledge of TPA within curriculum reform. Pyhältö et al. (2015, pp. 823) theorize that “development work (including reforms) always affects the dynamics of the professional community.” As no causal inferences of the nature between curriculum reform and TPA could be made in this study, it is impossible to make any conclusions about the relations between curriculum reform and the inhibition of constructing collective efficacy. *How* curriculum reforms affect the professional community in terms of experienced TPA is another line of inquiry that could be addressed further. In a study conducted in Czechia, Pešková et al. (2019) found teachers with high self-efficacy beliefs to hold more positive views about the curriculum reform. Further studies combining self-efficacy and collective efficacy beliefs in the Finnish curriculum reform would make for interesting material for examining how teachers respond to educational change on an individual versus collective level.

In a study of Finnish student teachers’ professional agency by Soini et al. (2015), Finnish teachers displayed a strong sense of agency from the beginning of their teacher training, but there was a lower perception of co-regulation of learning and collective efficacy even though teacher training at Finnish universities supports collaborative learning processes. A similar observation was made

by Toom et al. (2017), where collective efficacy was the lowest experienced aspect of TPA in a survey of Finnish student teachers. This seems to imply that the individual mindset described in the previous chapter is somehow internalized pre-career, possibly even before teacher training. Future research could address the transition from student teacher through early-career to experienced teacher from the viewpoint of collective efficacy in TPA.

One of the variables used to search for variation in TPA within this study was gender. There has been critique directed at quantitative methods concerning gender for several decades (see Jayaratne & Stewart 1991), particularly regarding dichotomous variables. Additionally, Jayratne and Stewart (1991, pp. 88) note that “research which only documents differences between the sexes offers no understanding of why those differences exist or how such differences may be attenuated and therefore may reinforce (or create) the public’s preconceived and sexist attitudes”. Only a very small amount of research reviewed for this study took up the issue of (socially constructed) gender in relation to teacher agency (e.g. Vitanova 2018), even though gender identity has been recognized as a factor in curriculum reform (see Paechter 2003). In terms of the interpretation of the results for this study, gender was approached as a dichotomous variable during data collection in 2016. As there were no further questions on gender identity and the data cannot get to any more depth concerning an individual teacher’s view on gender and teaching, result like this can only serve as a starting point for future studies. The result of proportionately more male teachers in low TPA clusters and more female teachers in the high TPA cluster could be explored in further studies concerning gender identity in teacher agency or professional communities within education in Finland.

Historically, curriculums have been evaluated by learning outcomes, educational objectives and a variety of policy-based evaluation models (Klenowski 2010; Sahlberg 2011). In addition, educational professionals’ levels of shared knowledge construction, learning and well-being at work need to be considered in successfully implemented school reforms (Tikkanen et al. 2020; Soini et al. 2021). Based on this study, perceived teacher agency and especially achieving a mutual feeling of a supportive context for reciprocal learning within the profes-

sional community can be thought as important factors in curriculum reforms. This supports previous findings in other contexts, where supporting teachers' agency improves curricular reforms and resulting teaching practices (Ramberg 2014; Pyhältö et al. 2014; Tao & Gao 2017; Park & Sung 2013).

Because of the complex nature of both TPA and curriculum reforms, these concepts should be considered highly intertwined and mutually influential. However, further separation in terms of empirical study and especially quantitative measures is called for. Finnish teachers already have a strong sense of TPA in curriculum reform, which based on the results of this study can be further cultivated to strengthen commitment to successful school development at the micro level of curriculum making.

8 References

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9 Appendices

APPENDIX 1

Cross-tabulation of initial clustering solutions.

		Hierarchical clustering		Total
		1	2	
K-means clustering	1	960 99%	2 1%	962 100%
	2	252 45%	306 55%	558 100%
Total		1212 80%	308 20%	1520 100%

APPENDIX 2

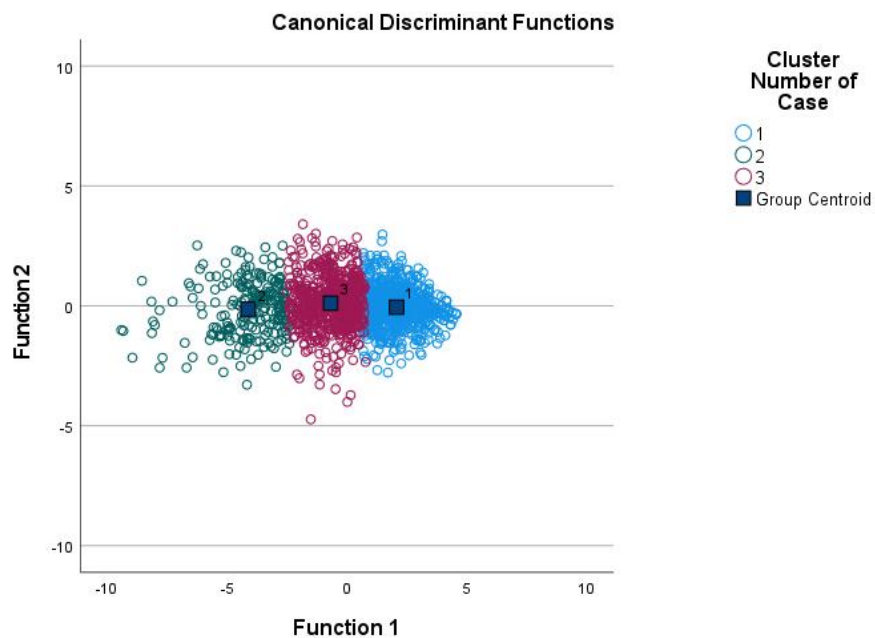
Test for variates discriminating the groups with scatter plot.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 2	.178	2611.211	10	.000
2	.991	14.243	4	.007

Standardized Canonical Discriminant Function Coefficients

	Function	
	1	2
PRAC	.275	.553
CE	.398	-.187
INTER	.418	-.804
AGRM	.489	.498
HELP	.458	.187



APPENDIX 3

Frequencies and confidence intervals for gender within each cluster.

		Sukupuoli							Bootstrap for Percent ^a	
Cluster	Number of Case	Frequency	Percent	Valid Percent	Cumulative Percent	Bias	Std. Error	95% Confidence Interval		
								Lower	Upper	
.	Valid	nainen	29	85.3	85.3	85.3	-.3	6.2	70.7	97.1
		mies	5	14.7	14.7	100.0	.3	6.2	2.9	29.3
		Total	34	100.0	100.0		-.3	5.5	100.0	100.0
1	Valid	nainen	503	80.5	80.5	80.5	.0	1.5	77.4	83.5
		mies	122	19.5	19.5	100.0	.0	1.5	16.5	22.6
		Total	625	100.0	100.0		.0	.0	100.0	100.0
2	Valid	nainen	129	65.8	65.8	65.8	.1	3.5	58.7	72.9
		mies	67	34.2	34.2	100.0	-.1	3.5	27.1	41.3
		Total	196	100.0	100.0		.0	.0	100.0	100.0
3	Valid	nainen	442	74.9	74.9	74.9	.0	1.8	71.4	78.1
		mies	148	25.1	25.1	100.0	.0	1.8	21.9	28.6
		Total	590	100.0	100.0		.0	.0	100.0	100.0

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples