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Student motivation in teacher learning groups

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ABSTRACT

The importance of social learning for student teachers' professional development has gained acknowledgement. One way in which teacher training institutes incorporate social learning in their curricula is by involving students in teacher learning groups (TLGs). Participation in TLGs not only enables students to develop social skills, but also prevents them from feeling isolated and losing motivation for their studies. The present study uses convergent parallel mixed-methods design to search for relationships between TLGs' social configuration and motivation among participating students ($n = 55$) of four Dutch primary teacher training institutes. The analyses reveal seven key variables for student motivation in TLGs: autonomous choices regarding content; new knowledge; sharing, support, and social skills; personal goals; autonomous choices regarding collaborating partners; scaffolding; equality in an informal atmosphere. Based on the findings, we advise teacher training institutes to consider integrating homogeneous and heterogeneous TLGs in their curricula, because both are valuable for student motivation.

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Teacher education; teacher learning groups; learning communities; social configuration; motivation for learning

1. Introduction

The value of social learning in the educational field has gained acknowledgement over the past decade (e.g. Boud and Hager 2012; Littlejohn et al. 2019; Van Schaik et al. 2019). Teachers increasingly prefer social learning to individual learning in order to cope with current educational complex problems, such as dwindling student numbers, high variety in student population, and the risk of study delay or dropout (Littlejohn et al. 2019). Teacher learning groups (TLGs) are proposed as a promising enactment of this increasing shift towards the importance of social learning in education (Van Schaik et al. 2019; Vrieling-Teunter, Van den Beemt, and De Laat 2019). TLGs are defined as social configurations (i.e. social patterns of group constellation, behaviour, and thinking) where teachers undertake collaborative learning activities with colleagues, resulting in a change in cognition and/or behaviour at the individual and/or group level

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(Doppenberg, Bakx, and Den Brok 2012). The social configuration that participants experience in their TLG is affected by its facilitation on key elements such as group composition and goals (Vrieling-Teunter, Van den Beemt, and De Laat 2019).

Social learning in TLGs is based on insights from network learning (i.e. relationship development), community learning (i.e. identity development), and team learning (i.e. development of formal learning structures) (Vrieling-Teunter, Van den Beemt, and De Laat 2016). The term TLGs is defined broadly because teacher collaboration in practice often demonstrates varied forms of social learning and can be generally seen as sharing problems and insights in a constructive way, connecting with familiar concepts and using new knowledge that is collectively constructed through dialogues and social interactions (Wenger, Trayner, and De Laat 2011). In this way, TLGs can support participants in developing their inquiry skills and contribute to professional learning, action and innovation (Goodyear 2019), but can also prevent isolation and loss of motivation among (starting) teachers (Admiraal, Lockhorst, and Van der Pol 2012).

In practice, it is often challenging and time-consuming for TLGs to meet their ideal social configuration for teacher growth (Prenger, Poortman, and Hanelzalts 2021; Vrieling-Teunter, Van den Beemt, and De Laat 2016). Previous research of Vrieling-Teunter, Vermeulen, and De Vreugd (accepted) has shown that an optimal social configuration in TLGs covers three social learning dimensions. First, it is necessary to relate the knowledge created and shared in TLGs, with teachers' day-to-day activities (i.e. practice integration). This resembles the professional activities on which the group is focused as well as the embeddedness in practice. Second, TLG activities should be oriented towards short- and long-term goals that reflect the social learning attitude of the participants (i.e. long term orientation and goals). This attitude enables the participants to develop a long-term perspective with a focus on continuous learning and innovation. Third, it is important for group members to work interdependently and in equal relationships with a shared purpose and responsibility for collective success (i.e. shared identity and equal relationships). The latter is closely related to the relational part of the Social Capital Theory, which explains the outcomes of social learning by means of intellectual capital (Nahapiet and Ghoshal 1998). Intellectual capital can be described as the knowledge and knowledge potential of social configurations such as TLGs, in which explicit and hidden knowledge combines with individual and collective knowledge (Nahapiet and Ghoshal 1998). Vrieling-Teunter, Vermeulen, and De Vreugd (accepted) argue that the three social learning dimensions promote teachers' collective reflection and open dialogue, and enhance group learning.

Because of these envisaged benefits, it is recommended to involve prospective teachers (hereinafter students) to participate in TLGs (Luyten and Bazo 2019). This involves that next to students, also teachers, teacher educators, researchers and experts can be part of TLGs, leading to more opportunities for students to exchange knowledge and practical advice with others (Van Schaik et al. 2019; Vrieling-Teunter, Van den Beemt, and De Laat 2019). In this way, students can actively learn to deal with social skills in order to be prepared for a society in which social learning is becoming increasingly important (Sewel et al. 2018). Providing opportunities for students to experience social practices themselves and to understand the challenges as an integral part of teacher education curricula, stimulates their professional development (Sewel et al. 2018). This would argue in favour of TLGs, where more experienced participants (experts) can make social skills

(e.g. active listening) more explicit through the use of modelling (Vrieling-Teunter, Stijnen, and Bastiaens 2018). This means that experts gradually decrease guidance when the students are able to perform more independently (i.e. scaffolding; Salonen, Vauras, and Efklides 2005).

At the same time, student welfare is high on the political agenda in the Netherlands due to increasing psychological problems of students in higher education (Den Brok, Wubbels, and Van Tartwijk 2017). Third- and fourth-year students often feel lonely because their study programme contains a large amount of individual work, and they feel that they become increasingly 'off-the-radar' at their institute (Vrieling-Teunter, Hebing, and Vermeulen 2021). Although students enjoy working on practice-based assignments that are embedded in the workplace, they experience a lack of connection with their training institute and their peers. An important part of feelings of wellbeing concerns motivation which is related to student success (Howard et al. 2021; Niemiec and Ryan 2009). From the background of various theories on motivation, Steers, Mowday, and Shapiro (2004) describe motivation as 'factors or events that energize, channel, and sustain human behaviour over time' (p. 379). According to Eteläpelto et al. (2005), students' active agency in TLGs is connected to positive experiences, which are perceived as important for students' motivation to study. Active participation in TLGs within teacher training could therefore contribute positively to students' motivation (Eteläpelto et al. 2005) that can subsequently be beneficial for their study activities.

The rationale behind engaging in TLGs is that learning is done from an autonomous, intrinsic learning need, where the direct applicability of the acquired knowledge increases the participants' competence in relation to others (De Laat 2012; Van Amersfoort et al. 2019). This is in line with the tenets of the basic psychological needs of the Social Determination Theory that must be met to foster intrinsic motivation, namely the need for autonomy, competence and relatedness (Deci and Ryan 2008). TLGs are guided by activities that are driven by intrinsic motivation provided by the activity itself and not by an external positive or negative reward that is contingent upon the completion of the activity (de Brabander and Martens 2014). From this perspective, TLGs strive for (1) autonomy that relates to the opportunity for participants to be self-responsible in determining the content of the TLG; (2) competence that is connected to the experience of finding a solution for an educational challenge that is elaborated in the TLG and that is achievable for all participants; and (3) relatedness that refers to the feeling of connectedness to fellow members of the TLG (de Brabander and Martens 2014).

Overall, based on the aforementioned arguments, it is important to actively allow students to participate in TLGs where they get opportunities to gradually build up their social skills (Sewel et al. 2018). Furthermore, active participation in TLGs can contribute positively to students' motivation for learning as an important factor for study success and wellbeing (Eteläpelto et al. 2005). However, to date it is not yet clear which social configuration of TLGs is most optimal for student motivation. This makes it difficult for teacher training programmes to determine how they can best design their curriculum and how to facilitate students in TLGs (Dobber et al. 2013). As a result, social learning in TLGs is shaped in various ways within teacher training programmes (Vrieling-Teunter, Hebing, and Vermeulen 2021). To capture this variety in social configurations, in this study we monitor students in TLGs in four primary teacher training institutes. The social

configuration of the TLGs is mapped to the three social learning dimensions of practice integration, long term orientation and goals, and shared identity and equal relationships (Vrieling-Teunter, Vermeulen, and De Vreugd [accepted](#)). Student motivation in TLGs is assessed on the basis of the Social Determination Theory including the basic psychological needs of autonomy, competence, and relationship (Deci and Ryan [2008](#)). The main research question of this research is therefore: To what extent is TLGs' social configuration related to student motivation?

2. Method

2.1 Design

A convergent parallel mixed-methods design was used to obtain a detailed insight into complex social phenomena (Creswell [2014](#)). Data was collected both qualitatively and quantitatively, including student experiences of social configuration and motivation during their participation in a TLG, at four different primary teacher training institutes in the Netherlands. The students participated in TLGs during one academic year (September 2019 to June 2020). Data was gathered at the end of the academic year, as by then students had gained sufficient experience of learning together in TLGs. The composition of the TLGs differed since the four institutes had their own guidelines in composing the TLGs and distributing their students among the TLGs (see [Section 2.2](#)). Since the four teacher training institutes were facilitated differently in their TLG key elements (i.e. composition, goals, frequency, duration, guidance, and assessment of the meetings; see [Section 2.2](#)), this gave us the opportunity to investigate in which way students experienced a variety in social configurations of TLGs and if TLGs' social configurations were related to student motivation. The variables social configuration and motivation were qualitatively mapped by means of interviews after the last TLG meeting (May/June 2020). The variables were measured quantitatively with respectively the 'Dimensions of Social Learning Questionnaire' (DSLQ; Vrieling-Teunter, Vermeulen, and De Vreugd [accepted](#)) and the 'Basic Psychological Need Satisfaction and Frustration Scale' (BPNSFS; Chen et al. [2015](#)). Students completed both questionnaires during the last TLG meeting (April/May 2020) by means of online application.

2.2 Respondents

The respondents in this study were 55 students (from the total of 119 students), aged between 18 and 30 (80% female) that participated in TLGs from four primary teacher training institutes in different regions of the Netherlands. The data collection was conducted in three rounds: (1) students were approached for participation via an online application; (2) after one week, a reminder was sent via the online application; (3) after two weeks, a reminder was sent per institute via email with a link to the online application. Response rates varied between the institutes from 26 to 55%; the overall response rate was 46% (see [Table 1](#)). The data were gathered in compliance with ethical norms; students gave active informed consent and participated voluntarily. All responding students participated in TLGs at their institute. We provide a short description of the TLGs at

Table 1. Overview key elements of the TLGs in the four institutes (n = 55).

	Institute A n = 9 (response 45%)	Institute B n = 5 (response 26%)	Institute C n = 7 (response 39%)	Institute D n = 34 (response 55%)
Composition	Fourth-year students sometimes aided by a teacher educator in groups of three to five members	One group of five third-year students supported by self-selected teachers, teacher educators, researchers and experts	First- to third year students together with teachers, teacher educators and researchers in groups of maximum three students; 10 to 20 participants in total	Third-year students collaborating with teachers and teacher educators with a maximum of twelve students per group; 10 to 20 participants in total
Goals	Exchanging feedback and ideas related to subject of the minor	Developing answers to students' individual research questions pertaining to innovative education	Collaborating on one research project centred around a question from educational practice	Collaborating on one research project centred around a question from educational practice.
Frequency	Twelve meetings	20 meetings	Six to eight meetings	Eight meetings; eight lessons were organised to prepare students for the TLG meetings
Duration	80 minutes	240 minutes	90–240 minutes	210 minutes
Guidance	Side-line support by teacher educators	Students take initiative inviting teachers, teacher educators, researchers and experts themselves	Leadership by teachers and a senior researcher in the lead of research activities	Supervised by teacher educators
Assessment	Portfolio conversation with teacher educators in which students reflected on their learning in the TLG	Practical- or research assignment that was assessed by teacher educators employing a rubric that fitted the personal learning question and the way in which this learning question had been answered	Based on a logbook, the students were assessed by teacher educators on how they spent their TLG hours as part of their portfolio	Assessment of final product; students' social skills were assessed by teacher educators with an educational tool

each institute below (see [Table 1](#)). In this overview we distinguish between composition, goals, frequency, duration, guidance, and assessment of the meetings. The authors were not involved in supervising or supporting the students in the TLGs, but collaborated as researchers with the institutes.

Institute A. The TLGs at this institute consisted of nine fourth-year students solely who chose the same minor (inquiry-based learning, diversity and civil education, or early childhood education). Thus, the TLG was in this sense homogeneous in its composition. These students – sometimes aided by a teacher educator – collaborated in groups of three to five members by exchanging feedback and ideas for their personal portfolio and research during 12 meetings of 80 minutes each. The teacher educators were not officially part of the TLG but were often present in the classroom to answer students' questions. The learning in the TLG was formally assessed by teacher educators as part of a portfolio conversation, meaning that students had to reflect on their learning in the TLG.

Institute B. One homogeneous TLG participated at this institute consisting of five third-year students. This TLG was part of a minor about innovative education. The students formed a TLG to develop answers to their own individual research questions. The TLG meetings were weekly or biweekly (in total about 20 meetings of 240 minutes). The TLG was student-directed; students took the initiative and determined the agenda of the meetings. They could also question or invite teachers, teacher educators, researchers, and experts themselves. There was no guidance on social skills, but students were supported and challenged by the questions which were posed in the TLG. The assessment involved a practical- or research assignment that was assessed by teacher educators employing a rubric that fitted the personal learning question and the way in which this learning question had been answered.

Institute C. At this institute seven first- to third-year students participated together with teachers, teacher educators, and researchers in heterogeneous TLGs. All participants collaborated on one research project centred around a question from educational practice. These questions were about a variety of topics, such as social entrepreneurship education and personalised learning with ICT. The TLGs were planned to collaborate during two academic years, although the present study only covered the first year of collaboration. A maximum of three students were allowed to participate per TLG and the total group size varied between 10 and 20 participants. The TLGs had six to eight meetings of 90–240 minutes; the duration varied per TLG and per meeting. The chairmanship lay with the teachers and the agenda was drawn up in agreement. A senior researcher from the institute was primarily in the lead of the research activities. The students from the higher years coached students from the lower years. Based on a logbook, the students were assessed by teacher educators on how they spent their (TLG) hours as part of the portfolio.

Institute D. In the heterogeneous TLGs at this institute, 34 third-year students collaborated with teachers and teacher educators on one research project centred around a question from educational practice. These questions included topics such as computational thinking, giftedness and pedagogical sensitivity from which students could choose in their minor. The TLGs collaborated during two academic years. The students in the present study participated in TLGs in both the first and second year of collaboration. A maximum of 12 students were allowed to participate per TLG and the total group size varied between 10 and 20 participants. The TLGs had eight meetings of 210 minutes. In

preparation for the TLG meetings, eight lessons were organised for students in the presence of the teacher educator. The participating teacher educators at the TLG were also the students' minor supervisors. In addition to the final product, students' social skills were assessed by teacher educators with an educational tool.

2.3 Instruments

To study the social configuration, the DSLQ (Vrieling-Teunter, Vermeulen, and De Vreugd [accepted](#)) was used. This validated instrument uses 13 self-reporting items to characterise the social configuration of TLGs. The questions are divided into three dimensions (i.e. Practice integration, Long term orientation and goals, and Shared identity and equal relationships; see [Table 2](#), column 2). Students indicated to which extent each item was applicable to their TLG. Answers were scored on a four-point Likert scale which runs from 'not at all applicable' to 'fully applicable'. [Table 2](#) outlines the number of items (column 3), sample questions for each scale (column 4) and Cronbach's Alpha's for the scales of the DSLQ (column 5). Cronbach's Alpha's were 0.89 (Practice integration), 0.89 (Long term orientation and goals) and 0.88 (Shared identity and equal relationships). In general, considering the number of items within each scale (3–5), these values imply good reliability and homogeneity of items within the scales of the questionnaire (Field [2013](#)).

For motivation, we used the Dutch version (Jansen in de Wal et al. [2014](#)) of the BPNSFS (Chen et al. [2015](#)). This validated instrument distinguishes 17 self-reporting questions to describe students' motivation on three scales (Autonomy, Competence, and Relatedness; see [Table 2](#), column 2). Answers were scored on a four-point Likert scale which runs from 'not at all applicable' to 'fully applicable'. [Table 2](#) outlines the number of items (column 3), sample questions for each scale (column 4) and Cronbach's Alpha's for the scales of the BPNSFS (column 5). Cronbach's Alpha's were 0.71 (Autonomy), 0.87 (Competence) and 0.88 (Relatedness). In general, considering the number of items within each scale (4–7), these values imply reasonable to good reliability and homogeneity of items within the scales of the questionnaire (Field [2013](#)).

Table 2. Example items and interview questions from the DSLQ and BPNSFS.

	Scale	Number of items	Example items questionnaire	Cronbach's alpha	Example items interview
DSLQ	Practice integration	5	Agreements about testing group products in classroom practice	.89	In what way are the experiences in practice communicated within the TLG?
	Long term orientation and goals	3	Conversation about short and long term goals	.89	In what way are the TLG activities connected?
	Shared identity and equal relationships	5	Feeling of belonging to the group	.88	Which feelings characterise the members' belongingness to the TLG?
BPNSFS	Autonomy	4	In my TLG, I have a sense of choice and freedom in the things I do	.71	To what extent do the activities of the TLG fit in with your own learning goals?
	Competence	6	In my TLG, I feel competent in what I do	.87	To what extent do you think you can achieve your learning goals within the TLG?
	Relatedness	7	I feel connected to my TLG	.88	To what extent do you feel free to express yourself in the TLG?

For the qualitative measurement, students were approached by the project leaders of the four institutions, asking who was interested in participating in the interviews. Seven students (two students for institutes A, C, D, and one student for institute B) were interviewed online for social configuration and seven other students (two students for institutes A, C, D, and one student for institute B) were interviewed online for motivation. The interviews for both social configuration and motivation took approximately 60 minutes to administer and were conducted online considering COVID-19. In order not to overload the students, we surveyed students on one of the two variables. Since we were interested in the social configuration of the TLGs in each institute, it was legitimate to relate these scores to the students' motivation findings because the relationships say something about motivation and social configuration for the TLGs in that institute.

The social configuration questions were based on the work of Vrieling-Teunter, Van den Beemt, and De Laat (2019). A biographical approach (Bornat 2008) was used, with participants asked to recount the social processes from the time of the first TLG meeting to the TLG's situation of the observations. Table 2, column 6, presents sample interview questions for each of the dimensions. The motivation questions were grounded on the motivation interview of Jansen in de Wal (2016). This guide contains key questions per scale with suggestions for continuing questions. Table 2, column 6, presents sample interview questions for each of the scales. The interview questions specifically addressed the practice of the TLG and how the scales were related to the students' school assignments and learning goals. The interviews were audio recorded and transcribed, after which they were presented to the students for verification (member check).

2.4 Data-analysis

The qualitative data were transcribed, coded and analysed using the program NVivo 12. The data were analysed in two cycles. During the first cycle, relevant text fragments were analysed and labelled by two researchers, separately for social configuration (Practice integration, Long-term orientation and goals, Shared identity and equal relationships) and motivation (Autonomy, Competence, Relatedness). During the second cycle, relationships between motivation and social configuration were analysed among the labelled fragments of a three-by-three model that consisted of the three dimensions of social configuration and the three scales of motivation. The analysis included within- and between-case comparisons, to gain a deeper insight into how the three dimensions of social configuration related to the three motivation scales. The analysis was done in an iterative process based on intersubjective agreement in two rounds where first two researchers analysed the data followed by a second round of two researchers whereby one of the researchers participated in both rounds. The interpretations were discussed and verified in the project team (Creswell 2014).

Regarding the quantitative data-analyses, non-parametric testing (SPSS 24) was appropriate, because the research population consisted of different institutes with varying number of respondents (see Table 1). While the respondent groups from Institutes A, B and C were small and variables were not normally distributed, the criteria to use parametric testing were violated (Field 2013). Therefore, to examine differences between

the institutes on the three dimensions of social configuration and the three scales of motivation, we applied Kruskal-Wallis. For correlation tests, the same assumptions (sufficient respondent numbers, normal distribution) should be taken into account. Consequently, Kendall's-tau was imperative (Field 2013) for testing the relationships between the three dimensions of social configuration and the three scales of motivation. Since we expected a positive relationship based on theory, 1-tailed testing was used.

3. Results

Table 3 presents the descriptive data of the TLGs at the four institutes with respect to social configuration and motivation. Kruskal-Wallis revealed that only the variable Practice integration differed significantly between institutes.

In this section, we describe the results of the quantitative and qualitative analyses for each relationship studied from our three-by-three model (see Section 2.4). The relationship between Practice integration and Autonomy was only significant for institute D (see Table 4, $r_T = .393$, $p < .01$). Qualitative analysis showed different fragments of institutes B, C and D referring to this relationship that we labelled as *Autonomous choices regarding content*. The analyses revealed that for Practice integration, students differentiated between integration into primary school practice and integration into teacher training practice. Students indicated the importance of being able to make autonomous choices regarding content in their TLGs. In homogeneous TLGs (institutes A and B), this was a natural process because students worked on their own goals. In heterogeneous TLGs (institutes C and D), it meant that within the collective framework of the TLG, students also pursued their own individual goals. As a consequence, the TLG facilitator had to make effort for alignment: *'Let me put it this way: she [the teacher educator] always came up with a concept. Those first few things were fixed, but the moment we started working on them, it was always: if you like it, shall we do this or will you come up with another proposal?'* (Institute D).

The relationship between Practice integration and Competence was only significant for institute D (see Table 4, $r_T = .507$, $p < .01$). Qualitative analysis showed different fragments of institutes A, B, and D referring to this relationship that we labelled as *New knowledge*. In homogeneous TLGs, students acquired new knowledge from their own specialisms that was applicable in practice: *'I really did learn a lot, especially the*

Table 3. Descriptive statistics (four-point Likert, 1 = not at all applicable till 4 = fully applicable) for social configuration and motivation. Means and standard deviations (between brackets) are provided.

	Institute A ^a n = 9	Institute B ^b n = 5	Institute C n = 7	Institute D n = 34	Kruskal-Wallis ** p < .05
Dimensions of Social Learning					
Practice integration**	3.35 (0.51)	3.00 (0.85)	2.29 (0.55)	2.68 (0.75)	.03
Long term orientation and goals	2.33 (0.87)	2.67 (1.25)	3.14 (0.69)	2.95 (0.47)	.32
Shared identity and equal relationships	3.35 (0.51)	3.40 (0.69)	3.14 (0.56)	3.19 (0.58)	.78
Motivation					
Autonomy	2.92 (0.43)	3.15 (0.89)	2.89 (0.48)	2.88 (0.58)	.90
Competence	3.37 (0.39)	3.40 (0.80)	3.17 (0.37)	3.06 (0.55)	.35
Relatedness	3.57 (0.37)	3.57 (0.52)	3.20 (0.51)	3.13 (0.53)	.07

^aFor dimensions of social learning n = 8.

^bFor dimensions of social learning n = 4.

Table 4. Correlations between social configuration and motivation separate for the four institutes.

Institute A (n = 9)	Practice integration	Long term orientation and goals	Shared identity and equal relationships
Autonomy	$r_{\tau} = .038$	$r_{\tau} = -.043$ <i>Personal goals</i>	$r_{\tau} = .383$ <i>Autonomous choices regarding collaborating partners</i>
Competence	$r_{\tau} = -.039$ <i>New knowledge</i>	$r_{\tau} = -.082$	$r_{\tau} = .572^*$ <i>Scaffolding</i>
Relatedness	$r_{\tau} = .038$ <i>Sharing, support, and social skills</i>	$r_{\tau} = .039$	$r_{\tau} = .275$ <i>Equality in an informal atmosphere</i>
Institute B (n = 5)	Practice integration	Long term orientation and goals	Shared identity and equal relationships
Autonomy	$r_{\tau} = -.548$ <i>Autonomous choices regarding content</i>	$r_{\tau} = -.548$	$r_{\tau} = .000$ <i>Autonomous choices regarding collaborating partners</i>
Competence	$r_{\tau} = -.183$ <i>New knowledge</i>	$r_{\tau} = .183$	$r_{\tau} = .224$
Relatedness	$r_{\tau} = .000$	$r_{\tau} = .408$	$r_{\tau} = .224$
Institute C (n = 7)	Practice integration	Long term orientation and goals	Shared identity and equal relationships
Autonomy	$r_{\tau} = -.108$ <i>Autonomous choices regarding content</i>	$r_{\tau} = .278$ <i>Personal goals</i>	$r_{\tau} = .629^*$ <i>Autonomous choices regarding collaborating partners</i>
Competence	$r_{\tau} = .000$	$r_{\tau} = .167$	$r_{\tau} = .514$ <i>Scaffolding</i>
Relatedness	$r_{\tau} = -.108$	$r_{\tau} = .056$	$r_{\tau} = .514$
Institute D (n = 34)	Practice integration	Long term orientation and goals	Shared identity and equal relationships
Autonomy	$r_{\tau} = .393^{**}$ <i>Autonomous choices regarding content</i>	$r_{\tau} = .083$ <i>Personal goals</i>	$r_{\tau} = .488^{**}$ <i>Autonomous choices regarding collaborating partners</i>
Competence	$r_{\tau} = .507^{**}$ <i>New knowledge</i>	$r_{\tau} = .026$	$r_{\tau} = .641^{**}$ <i>Scaffolding</i>
Relatedness	$r_{\tau} = .404^{**}$ <i>Sharing, support, and social skills</i>	$r_{\tau} = .155$	$r_{\tau} = .599^{**}$ <i>Equality in an informal atmosphere</i>

* $p < .05$, ** $p < .01$, qualitative variables are shown in italics.

internship experiences that we shared with each other, that is very valuable'. (Institute A). In heterogeneous TLGs, new knowledge was mainly created in the form of research that linked theory and practice: 'Yes, I did like working with teachers, just that practice comes up. Normally it's just the theory and otherwise the theory is based on practice. But now you hear really well, for example, how things went that day. I really like that. I liked the collaboration'. (Institute D).

The relationship between Practice integration and Relatedness was only significant for institute D (see Table 4, $r_{\tau} = .404$, $p < .01$). Qualitative analysis showed different fragments of institutes A and D referring to this relationship that we labelled as *Sharing, support, and social skills*. In homogeneous TLGs, students shared experiences which led to recognition that was supportive to reach their goals: *'An internship goal for me was to make contact with parents. I find that quite difficult, often because I have the idea that they think: oh, you're so young, what do you know about it. And then it's just really nice that you can talk about it and that it often feels that way to them too'. (Institute A). Students helped each other in the form of feedback and emotional*

support so that all group members could complete the assignments. In heterogeneous TLGs, the diversity of participants made it possible to share experiences and provide feedback from theoretical and practical perspectives, but the emotional support was less prominent. In both kinds of TLGs, working together contributed to the development of social skills: *'I think that if you learn to work with people, you should also be able to do that at work. So the more experience you have gained, the better it is when you yourself are in a team of people with whom you have to work.'* (Institute A).

The relationship between Long term orientation and goals and Autonomy was not significant for all institutes. Grounded on qualitative analysis, we found different fragments of institutes A, C and D referring to this relationship that we labelled as *Personal goals*. In homogeneous TLGs, students worked on their own goals based on sharing experiences and giving feedback and support to each other (see also the variable Sharing, support, and social skills). The collaboration also contributed to the planning of students: *'Because I worked with these two students, I knew that we would plan everything and I would finish my assignments in time.'* (Institute A). In heterogeneous TLGs, students worked on their own goals within the collective framework of the TLG. Important here was that the value of these collective goals and the part the students were performing became clear: *'I'm just kind of wondering what exactly the purpose of the TLG is and why we are doing this?'* (Institute C). The relationships between Long term orientation and goals and Competence, and between Long term orientation and goals and Relationships were not significant for all institutes. Qualitative analysis did not show fragments referring to this relationship either.

The relationship between Shared identity and equal relationships and Autonomy was only significant for institute C (see Table 4, $r_{\tau} = .629, p < .05$) and institute D (see Table 4, $r_{\tau} = .488, p < .01$). Qualitative analysis showed different fragments of all institutes referring to this relationship that we labelled as *Autonomous choices regarding collaborating partners*. In homogeneous TLGs, this autonomous choice led to students being able to exchange experiences with collaborative partners and provide each other with feedback in a familiar atmosphere. Working with reliable partners turned out to be important to be able to work from comparable motivation, goals and planning towards a final product in mutual dependency: *'I do like the fact that I can choose who I want to work with, also because within our class the intrinsic motivation of students really varied.'* (Institute A). In heterogeneous TLGs, the students usually could not make these autonomous choices. Others often took the lead so that the group composition was fixed in advance.

The relationship between Shared identity and equal relationships and Competence was only significant for institute A (see Table 4, $r_{\tau} = .572, p < .05$) and institute D (see Table 4, $r_{\tau} = .641, p < .01$). Qualitative analysis showed different fragments of institutes A, C, and D referring to this relationship that we labelled as *Scaffolding*. For students in homogeneous TLGs, scaffolding by the facilitator (e.g. the teacher educator) was important to prevent study delay. Learning together in heterogeneous TLGs was quite exciting for students and took some getting used to: *'It was all quite new to me, because in this case there were also professionals there. So at the beginning I found it a bit, yes, not really weird, but a bit exciting, a bit of getting used to because normally you just do everything with students and classmates.'* (Institute D). By taking students along from the start and building up the skills to be learned step by step, new knowledge and enthusiasm were created. The students then first saw

how professionals worked and learned over time to take on more tasks: *'And this is really someone who is already in the profession. But actually I really liked having that, because that way you could also see a little bit of how this person acts'. (Institute D).*

The relationship between Shared identity and equal relationships and Relatedness was only significant for institute D (see Table 4, $r_r = .599$, $p < .01$). Qualitative analysis showed different fragments of institutes A and D referring to this relationship that we labelled as *Equality in an informal atmosphere*. Within homogeneous groups, equality arose naturally because students were allowed to choose their own group mates. These TLGs were mainly used to help each other, both emotionally and cognitively (see also the variable Sharing, support, and social skills). Within heterogeneous groups, equality emerged because working in a TLG was perceived as a new experience by all participants. Interacting in small groups with participants who shared the same passion proved to be conducive to the feeling of equality: *'When I look at the TLG, I really like it because you're not in a very big group, but you're with people who share the same passion. So all participants really want to be there and really want to do it'. (Institute D).* An informal atmosphere appeared important so that all participants were comfortable giving and receiving feedback.

4. Conclusion

Prospective teachers in upper grades often miss connection with their peers and institute while working on their minor or graduation project. Participating in TLGs offers them the opportunity to learn together with fellow students and experts on issues from the educational practice. This form of learning also fulfils the assumed value of social learning as an important form of teacher professionalisation. Therefore, we sought for the relationships between TLGs' social configuration and student basic psychological need fulfilment in relation to motivation as an important ingredient for their wellbeing. In general, the results show that the more strongly dimensions of social configuration were experienced, the more strongly the motivation scales were perceived. Grounded on the qualitative findings, we found seven variables that are of importance for student motivation in TLGs: (1) Autonomous choices regarding content, (2) New knowledge, (3) Sharing, support, and social skills, (4) Personal goals, (5) Autonomous choices regarding collaborating partners, (6) Scaffolding, and (7) Equality in an informal atmosphere.

From the quantitative analyses we only found significance differences between the institutes for the extent in which Practice integration was experienced. This may be due to the composition of the TLGs because practitioners were only part of heterogeneous TLGs. For the correlation between social configuration and motivation, we saw that two dimensions of social configuration (Practice integration, Shared identity and equal relationships) correlated with the three scales of motivation. This was especially evident at Institute D with the largest group size. These quantitative data support the qualitative findings and show that the group composition and more specific the distinction between homogeneous and heterogeneous TLGs turned out to be the most important in the elaboration of these variables. The composition of the TLGs was strongly related to the key elements (see Table 1): a different composition of the group, for example, leads to a different goal orientation and, related to this, the duration and quality of the meetings.

For homogeneous TLGs that consisted of students solely – sometimes accompanied by a teacher, teacher educator, researcher or expert – we saw that process-wise they were mainly for sharing and support which was perceived as very valuable by students. Support was both valued in terms of cognition (feedback) and emotion (assisting each other where necessary). The students from homogenous TLGs also developed social skills, but only in cooperation with fellow students. The importance of scaffolding was mentioned here to prevent study delay. From the point of view of outcomes, participation in a TLG led to new knowledge about one's own topics and contributed to the achievement of personal goals. Important preconditions were making autonomous choices, working on personal goals, choosing cooperative partners autonomously, and cooperating on an equal basis in an informal atmosphere. Because the students only collaborated with fellow students, these processes mostly arose naturally and required little support from facilitators.

Working together in heterogeneous TLGs offered students process-based opportunities to develop social skills in a group with a high degree of diversity. An important precondition was that these skills were learned step by step (scaffolding). From a revenue perspective, participation in heterogeneous TLGs led to new knowledge for students focused on the link between theory and practice that was obtained from the diversity of participants conducting research together. The other conditions that arose naturally in homogeneous TLGs required facilitation in heterogeneous TLGs. Because the heterogeneous TLGs worked from research projects with collective goals, it was important that students' individual goals aligned with them and that opportunities for content choices were provided. In addition, it was important to organise informal moments to get to know each other. Working together in equality from an informal atmosphere did not come naturally either, so students had to be taken along from the start. Working together in small groups based on shared passion contributed positively to this.

5. Discussion

We can relate the latter to the theory of social capital in which interaction is considered the key to innovation that could explain the differences between the homogeneous and heterogeneous TLGs. Relational capital as part of the intellectual capital implies the importance of the quality of relationships, which includes respect, friendship, affirmation, trust, obligations, and the degree to which people feel connected. The found differences between homogeneous and heterogeneous TLGs might be related to Granovetter's (1973) distinction between strong and weak relationships. The homogeneous TLGs from our study were characterised by strong reciprocal relationships between almost all members as a consequence of frequent intensive interaction. Such strong relationships support the development of trust, norms of reciprocity, and a common identity, and can thus lead to greater returns. However, it also easily creates inward orientation of the group as the variety of ideas will be less as well as the innovativeness of the group (Vermeulen 2016).

Heterogeneous TLGs in their turn represent a greater diversity of participants that results in more opportunities to interact with new ideas. Based on this greater diversity of ideas, heterogeneous TLGs are able to create new knowledge and innovate (Vermeulen 2016). This explains that heterogeneous TLGs consisting of links between people with other experiences (students and practitioners for example) are more innovative than homogeneous TLGs consisting of close relationships. This diversity generates tension

and discussion (Castelijns, Koster, and Vermeulen 2009): when the opinions are too far apart, the TLG is no longer vital, blockages occur and participants drop out. On the other hand, when the opinions are too close together, no new knowledge is created. The group has to find an optimum here and organise this tension in such a way that it remains a motor for development. A point for attention in this matter is the role of the students. They cannot drop out because participation in the TLG is an assignment. It is therefore important to include students in this challenging process and make them aware of the importance. Here lies an important task of the facilitator.

Based on these conclusions, it seems important for teacher educators to think carefully about the choice regarding working with homogeneous or heterogeneous TLGs in curricula. Both forms of learning appear to have value for student motivation. Working in homogeneous TLGs provides process-based sharing and support from peers who are in the same situation, leading to recognition and acknowledgement of each other's work and developing new knowledge. In this way, homogeneous TLGs generate a feeling of relatedness which is an important requisite for student motivation (Deci and Ryan 2008) and well-being. This approach is also relatively easy to facilitate. The ability to develop social skills in heterogeneous TLGs is also an important preparation for the teaching profession. Composing TLGs is thus a deliberate pedagogical and didactic choice. When heterogeneous TLGs are chosen, sufficient attention must be paid to scaffolding of social skills in order to provide students the opportunity to grow. Such social skills, for example the provision of peer-feedback, should be practised in a safe, equal environment (Vrieling-Teunter, Stijnen, and Bastiaens 2018) through the use of modelling (Schunk and Zimmerman 2007). This can be achieved, for example, by having students practice social skills as early as the first year of study and gradually building up to application within TLGs, among others. In institute D, we saw an example of this while students were prepared for the use of social skills in a preparatory lesson and subsequently monitored on the basis of a tool. This attention for social skills was also included in students' work-plan.

This study has some areas to consider. To measure social configuration, we used the DSLQ whose questioning focuses solely on primary school practice. However, the findings revealed that both primary school practice and teacher training practice are relevant to students. Our questions did not distinguish between these two contexts. This means that future research needs a modified question format for students on the Practice integration dimension. This also applies to the Long term orientation and goals dimension since goals may also differ in both contexts. For the questioning regarding the Shared identity and equal relationships dimension, the original items seem to suffice.

A second consideration is the question if homogenous TLGs really fit the definition of TLGs as described by Vrieling-Teunter, Hebing, and Vermeulen (2021). The homogeneous TLGs consisted of students solely with ample teacher guidance. For Practice integration, the homogeneous TLGs employed activities that indeed were embedded in practice. However, for Long term orientation and goals, the homogeneous TLGs were mostly oriented towards short-term goals without a focus on continuous learning and innovation. Also, for Shared identity and equal relationships, students strived for their individual goals without a collective aim. Perhaps the term student teachers learning groups fits better with these homogeneous groups since this form of social learning is primarily aimed at providing support and advice and not at developing new knowledge. In our definition of homogeneous groups, we assumed that all students are equal in the sense

that they are all novices in the profession whereby participation in the TLGs is part of their training, in contrast with other configurations containing a mix of students and (more) experienced practitioners. However, follow-up research could focus more on the (role of) diversity in these student groups.

Third, it should be considered that given the low number of student participants and institutes they come from, the research can serve as a multiple case study, however generalisations are not to be made. The study can be seen as a first step towards deriving design principles for student guidance in TLGs for the benefit of their motivation for learning. Since social learning is an important competency for teachers, it is recommended that the study should be extended empirically.

In conclusion, we recommend that teacher trainers make a conscious decision about the design of TLGs by asking the question what goal they serve; working in homogeneous TLGs leads to progressive understanding and improvement while heterogeneous TLGs generate more creativity and new perspectives. Here, teacher training institutions should take into account that students are often focused on the first form of outcomes. Learning to work in heterogeneous TLGs from multiple perspectives requires more effort to understand each other and to find a shared ambition, and need more support. For example, informal moments need to be created so that a shared frame of reference or relational capital is created. Thus, both forms of TLGs are distinct and lead to different outcomes. Our advice would be not to make a choice, but to integrate both forms into curricula because each has proven to be of value for student motivation.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Ethics declarations

The research was ethically approved by the cETO committee of the Open Universiteit under number U2019/03249/HVM.

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