

KARMEN KALK

Using blogs to promote and predict
reflection during teaching practice
and induction year



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LIST OF ORIGINAL PUBLICATIONS

The dissertation is based on the following original publications that are referenced in the text by their Roman numbers (Articles I–IV):

- I** Kalk, K., Luik, P., Taimalu, M., & Täht, K. (2014). Validity and reliability of two instruments to measure reflection: A confirmatory study. *TRAMES: A Journal of the Humanities & Social Sciences*, 18(2), 121–134. <http://doi.org/10.3176/tr.2014.2.02>
- II** Kalk, K., Luik, P., & Taimalu, M. (2012). Blogging and Self-Evaluation on the Use of Reflection in Teacher Education. In Mikk, J., Veisson, M., & Luik, P. (Eds.), *Lifelong Learning and Teacher Development. Estonian Studies in Education. Volume 4*. Frankfurt: Peter Lang
- III** Kalk, K., Luik, P., & Taimalu, M. (2019). The characteristics of students, blog groups and blogging that predict reflection in blogs during teaching practice and induction year. *Teaching and Teacher Education*, 86, 1–10. <https://doi.org/10.1016/j.tate.2019.102900>
- IV** Kalk, K., Luik, P., & Taimalu, M. (2019). The characteristics of Tutor Blogging Predicting Student Reflection In Blogs. In M. Herzog, Z. Kubincova, P. Han, & M. Temperini (Eds.), *Advances in Web-Based learning – ICWL 2019. Lecture Notes in Computer Science. Volume 11841*. Cham: Springer. https://doi.org/10.1007/978-3-030-35758-0_12

Author contributions:

Current study was conducted through project of European Social Fund programme EDUKO exploring new opportunities to support teachers' professional development. The author was one member of research group of the subtopic of how to use the blog to improve teacher training. There were five members in the research group including also both supervisors of the current dissertation, Olivia Voltri, and Karin Naruskov. The author contributed to the publication as follows:

For Article I: Adapting the questionnaires into Estonian settings, formulating the research questions, planning and carrying out data collection and analysis, writing the paper as the main author.

For Article II: creating and designing the blogs, formulating the research questions, developing the coding manual to analyse content of the blog posts, planning and carrying out data collection and analysis, writing the paper as the main author.

For Article III: formulating the research questions, planning and carrying out data collection and analysis, writing the paper as the main author.

For Article IV: formulating the research questions, planning and carrying out data collection and analysis, writing the paper as the main author.

Related papers:

Luik, P., Voltri, O., Taimalu, M., & **Kalk, K.** (2011). On the use of student teacher blogs during teaching practice. *Procedia – Social and Behavioral Sciences*, 11, 165–169.

Luik, P., Taimalu, M., Voltri, O., & **Kalk, K.** (2013). Pedagoogilise praktika ja kutseaasta jooksul blogi kasutamise seosed refleksiooni, õpetaja enesetõhususe ja õpetajakutse valiku motivatsiooniteguritega. Krull, E.; Leijen, Ä.; Lepik, M.; Mikk, J.; Talts, L.; Õun, T. (Toim.). *Õpetajate professionaalne areng ja selle toetamine. Projekti „Õpetajate professionaalne areng ja selle toetamine“ tulemused õpetajakoolituse teenistuses* (118–141).

1. INTRODUCTION

1.1 Research problem

Teacher education is constantly looking for ways to support the professional development of teachers. An essential basis for professional development is reflection (e.g. Killeavy & Moloney, 2010; K rkk , Kyr - mm la, & Turunen, 2016), which facilitates learning from one’s experiences and from those of others (Mauri, Clara, Colomina, & Onrubia, 2017). Reflection is the “active, persistent and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends” (Dewey, 1933, p. 9). Future teachers need knowledge, skills and habits to reflect (Moon, 1999; Poom-Valickis & Mathews, 2013; Sarv & Karm, 2013). The reflection has been a mandatory competence in the teachers’ occupational qualification standard in Estonia (Kutsestandard..., 2013; 2020). Nevertheless, different studies (e.g. Poom-Valickis, 2007; Poom-Valickis & L fstr m, 2014) still noted that teachers’ reflections skills were low. Therefore, teacher education should focus more on reflection to promote professional development.

Written reflection as one form of reflection is considered especially important in teacher education (Fund, Court, & Kramarski, 2002). The process of writing is an intensive and focused activity that promotes deeper thinking and analysis (Bolton, 2001), and written text can be revisited and re-examined at a later date (Adeani, Febriani, & Syafryadin, 2020; Boud, 2001). In addition to supporting written reflection, it is essential to monitor how the reflection is used during learning (Chaumba, 2015). Two methods are the most widely used to assess reflection – content of writings (Kori, Pedaste, Leijen, & M eots, 2014; Sim & Hew, 2010) and self-reported scales (Sim & Hew, 2010). Some researchers have suggested using a combination of different instruments (e.g. Killeavy & Moloney, 2010; Pinya & Rossello, 2016) to study reflection as a complex phenomenon (Williams et al., 2019). For example, while content analysis of written texts studies written reflection (Tang, 2013), the reflection scales enable assessing general evaluations of using reflection. However, it has been noted that measuring reflection is a challenge because it cannot be monitored directly (Williams et al., 2019) and there is no consensus on how to assess the quality of written reflection (Dymont & O’Connell, 2010; Kember et al., 1999).

The importance of a learner-centred approach to learning is increasingly emphasised nowadays. This approach is mainly characterised by the learners’ activeness and responsibility for their learning and knowledge construction through collaboration and interaction (Postareff & Lindblom-Yl nne, 2008). Social interaction has also been considered helpful in developing reflection skills (e.g. Dewey, 1933; Kolb, 1984), which is supported by social constructivist learning theory (Vygotski, 1978). Constructing knowledge together increases teachers’ reflection skills (Nambiar & Thang, 2016). Reflecting with others allows us to see situations from different perspectives (Allas, Leijen, & Toom,

2020; Boud, 2001; Rodgers, 2002; Sarv & Karm, 2013). As social interaction can support reflection, teacher education should provide opportunities for reflection with other learners.

In a context of significant change in the world and the rapid development of technological opportunities, it would be appropriate to use the potential of information communication technology (ICT) tools to support reflection through social interaction. The part of ICT tools is social media that enables learners to take responsibility for their learning and easily share thoughts, opinions, and experiences with others (Kang, Bonk, & Kim, 2011). By integrating digital solutions in the learning process, learners can use suitable methods for reflection (Eutser & Curcio, 2019). Further, digital competence has been an important aspect of the Estonian teachers' occupational qualification standard (Kutsestandard..., 2013, 2020). Thus, the use of ICT tools is essential for the professional development of teachers.

One possibility to support written reflection through ICT tools is using blogs in teacher education, which has been the focus of numerous studies (e.g. Biberman-Shalev, 2019; Yang & Chang, 2012). The features of a blog contribute to the demands of the learning process in today's context (Biberman-Shalev, 2019; Kang et al., 2011) and enable written reflection among learners (Biberman-Shalev, 2018; Yang & Chang, 2012). Using blogs promotes reflection through social interaction (Deng & Yuen, 2013; Harland & Wondra, 2011), because their flexibility facilitates the sharing of thoughts at any time and place (Byington, 2011) and helps to prevent isolation from others (Dickey, 2004). Further, participants can reflect regularly and immediately in the blogs, not only later after the experience (Dalgarno, Reupert, & Bishop, 2015) or at the end of the course (Harland & Wondra, 2011). Teacher educators can follow the process of reflection during the learning process (e.g. Chaumba, 2015; Hramiak, Boulton, & Irwin, 2009). Reflection can be encouraged in the blog differently depending on the learning goal. While the aim is to teach reflection, blogs can be set up by providing explicit instructions and guidance on reflection in the blogs themselves (e.g., Wopereis, Sloep, & Poortman, 2010; Xie, Ke, & Sharma, 2008). As the goal is to promote and practice reflection skills already learned, a blog can also be used primarily for communication, interaction, and sharing to facilitate reflection (Killeavy & Moloney, 2010).

Reflection and the models supporting it have been taught for more than 10 years in Estonian teacher education. During the planning stage of this study, opportunities were sought in teacher education at the University of Tartu to support joint learning and reflection better. The Gibbs model (1988) was introduced to student teachers and induction year teachers in the teacher education courses. Based on the Gibbs model, it is possible to determine what stage of the reflection process is reached (e.g. Tawanwongsri & Phenwan, 2019) in the blog posts and assess reflection skills. However, according to the organisation of teaching practice and the induction year at that time (Aineõpetajate pedagoogilise praktika..., 2011; Tallinna Ülikooli õpetajakoolituse..., s.a; Õpetajate koolituse raamnõuded, 2010; 2011), only a few seminars were held in which the students

from different schools and kindergartens could reflect together. Using collective blogs could be an alternative for supporting written reflection through interaction during the teaching practice and the induction year.

The use of blogs to support reflection has been studied previously, but the results are mixed. Several studies have shown that using a blog supports learners in developing a deeper level of reflection (e.g. Boulton & Hramiak, 2012; Stoszkowski & Collins, 2014, 2017). In contrast, others do not show the promotion of learner reflection in a blog (e.g. Duarte, 2015; McNeill, Brown, & Shaw, 2010). Based on the above, contradictory results in supporting reflection can come from different approaches of promoting reflection in blogs and assessing reflection. Further, the effectiveness of blogs in supporting reflection may be due to how the blog groups are formed and who participates in the blog. Studies have shown that using blogs in the learning process, it is essential to take into account the characteristics that are related to the learners (e.g. Guadagno, Okdie, & Eno, 2007; Papastavrou, Hamari, Fuster, Istomina, & Salminen, 2016), instructors/tutors (e.g. Byington, 2011; Kuo, Belland, Kuo, 2017) and the blog groups (e.g. Chen, Wei, Wu, & Uden, 2009; Nambiar & Thang, 2016). However, the effect of the characteristics on reflection has been little studied in the blog environment. Researchers have highlighted the need to study the characteristics of learners (e.g., Chen, Wei, & Liu, 2011; Yu & Chiu, 2019), tutors (e.g. Bates, Ramirez, & Drits, 2009; Yu & Chiu, 2019) and the group activities (Chen et al., 2009; Yu & Chiu, 2019) that may affect learner reflection.

Based on the considerations above, reflection is necessary in teacher education but challenging to support and study. Social interaction and learning together, which promotes reflection, can be complicated during the teaching practice and induction year. Blogs are used in teacher education, but there are conflicting findings on using blogs to support reflection. It is necessary to find out how collective blogs can support written reflection and how different characteristics related to learners, blogs, and the tutors in the blog affect it.

1.2 Focus of the research

The dissertation aims to find out how blogs could be used during the teaching practice and induction year to promote reflection. More precisely, how the different characteristics of the participants and the blogging are related to reflection in blog posts based on the Gibbs model. Hereinafter, student teachers and induction year teachers are collectively referred to as “learners”.

In order to achieve the aim, the following research questions were posed:

1. How are the characteristics of the activeness of participants and blog groups related to changes in learner evaluations of using reflection based on questionnaires?

2. What characteristics of learners and their blogging predict written reflection in blog posts based on the Gibbs model?
3. What characteristics of a blog group and group blogging predict written reflection in blog posts based on the Gibbs model?
4. What characteristics of tutor blogging predict written reflection in blog posts based on the Gibbs model?

Questionnaires and blog posts were used to answer the research questions and fulfil the aim of the dissertation. Four articles were published to answer the four research questions:

Article I help to answer to the first research question. The aim of the article is to test the internal reliability and verify the validity of the two reflection scales: Reflection Questionnaire (Kember et al., 2000) and Reflection in Learning Scale (Sobral, 2001).

Article II responds to the first research question. The aim of the article is to determine how blogging supports reflection of both student teachers and induction year teachers based on the change in their evaluations of using reflection.

Article III responds to the second and third research questions. The aim of the article is to investigate which characteristics of learners, blog groups, and blogging predict the stage of reflection in the blog posts during teaching practice and induction year.

Article IV responds to the fourth research question. This article investigates the characteristics of tutors' blogging that predict the stage of reflection in blog posts during teaching practice and the induction year.

2. THEORETICAL BACKGROUND

This chapter presents the theoretical background of the dissertation. The concept of reflection is discussed in the first subchapter. It is important to choose suitable methods to promote and assess reflection. Hence, the second subchapter introduces blogs as a tool to support reflection and characteristics related to learners, blog groups and tutors that may affect learner reflection in the blogs. In addition, an overview of two widely used instruments for assessing reflection is also provided.

2.1 The concept and importance of reflection in teacher education

Researchers consider John Dewey to be the initiator of the concept of reflection. Based on Dewey (1933, p. 9), reflection is the “active, persistent and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the further conclusions to which it tends”. Critical reflection is also considered an important part of the reflection process because it leads to a broader understanding of meaning (Mezirow, 1991) and is the highest level of reflective thinking that can change perspectives, although it is difficult to achieve (Kember et al., 2000; Mezirow, 1991). Donald Schön developed Dewey’s theory of reflection (e.g. Van Beveren, Roets, Buysse, & Rutten, 2018; Lee, 2008; Rolfe, 2014) and stated that reflective practice is synonymous with professional thinking and considered teachers to be professionals who are reflective practitioners (Schön, 1983). Reflection helps teachers to look back at their teaching and analyse their experience. Analysing problems and situations enable a deeper understanding of experience (Sarma, 2015) involving the association of new knowledge and previous knowledge and drawing conclusions to improve teaching (Harland & Wondra, 2011). Reflection could promote the combination of experience and learning (Eutsler & Curcio, 2019; Paterson & Chapman, 2013) and becoming aware of one’s own competencies, beliefs, attitudes and values, which improves reflection skills and development as a teacher even more (Poom-Valickis & Löfström, 2014). By consciously synthesising their own experience from different perspectives, it is possible to see experience more broadly, learn from it and plan the future actions (Rodgers, 2002). Reflection helps to develop constantly as a teacher (Alger, 2006) and reflective teachers are better able to cope with the individual needs of students (Harland & Wondra, 2011). Thus, the outcome of reflection is a more professional and effective teacher.

It is considered important to support written reflection in teacher education (Fund et al., 2002). Writing as a means of reflection is a more intensive, longer and focused process than thinking and speaking, thus it encourages deeper thinking and analysis (Bolton, 2001). Thus, writing about experiences helps learners think about situations more thoroughly (Poldner, van der Schaaf, Simons, van Tartwijk,

& Wijngaards, 2014). Rethinking and writing down the thoughts and feelings helps to assess the experience more freely than during the situation (Boud, 2001) and encourages learners to think about the use of words and construct their own knowledge (Dos & Demir, 2013). Writing makes it possible to review the situation again, save it and return back for analysis (Adeani et al., 2020; Boud, 2001), while speech or thoughts may disappear (Bolton, 2001). Writing about one's own thoughts leads to more in-depth reflection, as the text has to be understandable and meaningful to readers (Granberg, 2010; Morris, Christie, & Barber, 2019). Further, writing is a more private and secure process than speaking until you share it with others (Bolton, 2001). Hence, it is important to promote written reflection in teacher education, as it can support learners' deeper analysis of the experience and drawing broader conclusions.

Several noted developers of the concept and models of reflection (e.g. John Dewey, Donald Schön, Jack Mezirow, David Kolb, David Boud, Graham Gibbs) have relied on constructivist learning theory when describing the process of reflection. Hartman (2012) has pointed out that constructivist theory is based on cognitive constructivism (e.g. Dewey, 1933) and social constructivism (e.g. Vygotski, 1978). These approaches are similar in that they both emphasise the learner's active role in constructing knowledge and reaching a higher level of thinking, and differ in how knowledge is constructed – individually or socially (Hartman, 2012). According to cognitive constructivism, learners themselves construct their new knowledge based on what they have learned before (Hoover, 1996). Social constructivism emphasises the importance of social interaction for the process of constructing individual knowledge, where sharing different perspectives and experiences helps improve meaning-making and learning (Vygotsky, 1978). Social interaction is also considered important in the development of reflection skills (e.g., Dewey, 1933; Kolb, 1984), because reflecting alone can lead to the affirmation of existing perceptions (Boud, 2001) and important aspects may go unnoticed (Rodgers, 2002). Learning with others and collaborative learning could be the part of social interaction (Okita, 2012). The presence of peers or a group is important in reflection. Reflection in the groups creates opportunities for dialogue including listening, talking, demonstrating, imitating (Sarv & Karm, 2013) and helps to follow, improve, supplement the thoughts (Allas et al., 2020). Learning with others allows us to look at our own experience from a more objective perspective (Leijen, Valtna, Leijen, & Pedaste, 2012) seeing the situation from the other point of view (Allas et al., 2020; Boud, 2001; Rodgers, 2002; Sarv & Karm, 2013) and also enforces to question and change one's beliefs (Boud, 2001; Sarv & Karm, 2013). The supportive community enables us to get advice (Rodgers, 2002) and getting feedback or suggestions may improve our practice (Allas et al., 2020). Consequently, constructivist learning theory is also the basis of this dissertation because active construction of one's own experiences individually and in interaction with other learners may promote reflection during the teaching practice and induction year.

However, attention should be paid to various factors that may affect reflection. Researchers have pointed out that it is important to take into account factors related to the individual and the environment when supporting reflection (e.g. Moon, 1999; Poom-Valickis & Mathews, 2013; Rogers, 2001). Specifically, the learner should be ready to reflect and become aware of the nature of reflection and its purpose. In addition, the learner should have the knowledge of how to reflect (Moon, 1999; Poom-Valickis & Mathews, 2013; Sarv & Karm, 2013). A supportive environment and sufficient time are required for the reflection (Moon, 1999; Szabo & Schwartz, 2011). For example, learning communities provide time and space for learners to study with peers and tutors (Le Cornu & Ewing, 2008). Further, the environment should support learning emotionally and encourage reflection (Moon, 1999; Sarv & Karm, 2013). The feedback and activities of peers (Sarv & Karm, 2013; Poom-Valickis & Mathews, 2013; Rogers, 2001) and the teacher or tutor (Poom-Valickis & Mathews, 2013; Sarv & Karm, 2013) are also emphasised in promoting reflection.

Teacher educators have to choose an appropriate form, process and method to support reflection in teacher education (Shoffner, 2008). Accordingly, it is important to choose how to promote social interaction and written reflection considering methods to teach and assess reflection, as well as taking into account the factors that affect reflection. One possibility is to implement ICT tools in teacher education because these support traditional face-to-face learning (Barclay, Donalds, & Osei-Bryson, 2018) and reflection (Eutser & Curcio, 2019). One such tool is a blog that has been the focus of numerous studies, as it contributes via written reflection (e.g. Biberman-Shalev, 2018; Yang & Chang, 2012). The focus of the dissertation is to promote written reflection in blogs through social interaction and assess reflection during blogging. The benefits of using blogs in promoting reflection, the characteristics affecting reflection and methods of assessing reflection are presented in more detail below.

2.2 The blog as a tool to support written reflection through social interaction

A blog is a tool for keeping an online journal to write about one's own experiences, personal news or interests that other people can read and comment on (Biberman-Shalev, 2019). Table 1 lists the features of blogs that support reflection in comparison to other means of communication. The table indicates that a blog has several advantages over other tools when it comes to supporting reflection.

Table 1. Features of different means of communication in supporting reflection

Features	Blog	Learning environment (e.g. Moodle)	Facebook	Forum
Enables regular written reflection	X	X	X	X
Enables sharing, communication and interaction at any time and place, prevents isolation	X	X	X	X
Orders posts chronologically	X			
Posts can be tagged	X		X	
Archives posts	X			
Unlimited period of use	X		X	X
Closed	X	X	X	

The advantage of using a blog as a type of journal in supporting reflection is the chronological sequence of posts (Biberman-Shalev, 2018, 2019; Sun, 2010), which makes it possible to go back in time, read earlier posts, compare them with subsequent written texts (Biberman-Shalev, 2018) and reflect on one's own learning process (Killeavy & Moloney, 2010; Sun, 2010). Tags and archives can be useful tools for monitoring the learning process by facilitating categorisation and in-depth monitoring of posts (Wopereis et al., 2010) as well as quick searches (Biberman-Shalev, 2018, 2019; Sim & Hew, 2010).

Blogs can be categorised as individual and collective (Biebermann-Shalev, 2018; 2019; Stoszkowski & Collins, 2014; 2017), where sharing, peer learning and socio-emotional support between blog members are considered important in collective blogs (Biberman-Shalev, 2018). The importance of the group and peers in reflection is emphasised (e.g. Sarv & Karm, 2013; Allas et al., 2020). Similarly, it has been found that in the collective blogs were a deeper analysis of one's own actions (Deng & Yuen, 2011) and a higher level of learner reflection in posts (Stoszkowski & Collins, 2014, 2017) rather than individual blogs. Accordingly, collective blogs are used in this dissertation with the aim to promote written reflection through social interaction. The use of blogs enables social interaction because teachers can share teaching experiences in a blog and can interact more intensively, immediately, interactively and inclusively with peers and tutors (Benigno & Trentin, 2000). In particular, a blog has posts that others can read; these posts can receive many comments and all the participants can read the correspondence (Byington, 2011; Petko, Egger, & Cantieni, 2017). Features that facilitate interaction are the reason why several researchers have cited Vygotsky's social constructivism theory when discussing the use of blogs in the learning process (e.g., Kuo et al., 2017; Sun, 2010; Stoszkowski & Collins, 2014).

The findings of studies dealing with the use of blogs to support reflection in higher education are contradictory. Several studies have shown that using a blog supports learners in developing a deeper level of reflection (e.g., Boulton & Hramiak, 2012; Dos & Demir, 2013; Stoszkowski & Collins, 2014, 2017). However, there are also findings that do not show the promotion of learner reflection in a blog (e.g., Dalgarno et al., 2015; Duarte, 2015; McNeill et al., 2010). The difference in the results may be due to how the blogs are set up and who participates in the blog. In particular, there are various educational approaches on teaching and supporting reflection in a blog that are presented below.

2.2.1 Supporting reflection in the blog

A tool alone cannot engender deeper reflection (Hall, 2018), and therefore it is important to choose an appropriate way to promote learner reflection in a blog. Reflection in a blog can be taught by providing explicit instructions on reflection in the blog; for example, learners can follow some reflection structure or model (Hall, 2018; Stoszkowski & Collins, 2014; Wopereis et al., 2010; Xie et al., 2008) or by giving assignments that support blogging and reflection (Freeman & Brett, 2012). However, reflection in the blog can also be supported more indirectly, where the goal was not the explicit instruction and teaching of reflection. The emphasis has been primarily on communicating and sharing as a means to facilitate reflection (Killeavy & Moloney, 2010; Top, Yukselturk, & Inan, 2010; Yang, 2009).

In particular, in studies where the goal was not the explicit instruction and teaching of reflection, it was assumed that learners can rely on previously acquired reflection skills for blogging (Killeavy & Moloney, 2010), and the voluntary nature of blogging and limited guidance for supporting reflection in an informal environment has been emphasised (Deng & Yuen, 2011; Prinsloo, Slade, Galpin, 2011), or the actions of tutors who are not specifically teaching reflection have been the focus. For instance, tutors can provide feedback and guide learners to express themselves in a blog (Chu, Chan, & Tiwari, 2012; Top et al., 2010; Yang, 2009), and monitor and evaluate learners in the learning process (Chu et al., 2012; Top et al., 2010) in order to optimise interaction and reflection. The focus of this dissertation is not to teach reflection in the blog because learners study to reflect during their teacher training; but to promote learners' social interaction in the blog and provide guiding questions and tasks to support reflection.

With these different approaches, a variety of conclusions has been reached about supporting learner reflection. On the one hand, it has been found that assignments and mandatory blogging are helpful for consistent reflection and acceptance of blogging, while voluntary blogging may not provide enough motivation for learners to write blog posts (Freeman & Brett, 2012). On the other hand, mandatory blogging can reduce spontaneity (Deng & Yuen, 2011; Prinsloo et al., 2011), privacy (Prinsloo et al., 2011), free expression and socialisation in

reflection (Deng & Yuen, 2011). A blog can be used primarily for assignments (e.g., Chu et al., 2012; Freeman & Brett, 2012; Top et al., 2010), which can make the blog too formal, with learners simply performing the exercises without any motivation or interest in otherwise using the blog (Chu et al., 2012; Petko et al., 2017). In addition, a pre-defined framework can be helpful as a reminder of the need to reflect but learners can use this mechanically without considering their own insecurities, questions, meaning or context (Boud & Walker, 1998), and learners can merely write the expected answer to guiding questions or assignments without focusing on actual reflection (Furberg, 2009). At the same time, voluntary blogging in an informal setting seems to facilitate reflection because the people who blog are those who are motivated to do so (Petko et al., 2017). The voluntary use of blogs in learning might not motivate the active participation of learners in the blog (Chu et al., 2012; Duarte, 2015) and thus might not support learner reflection. Non-guided reflection facilitates spontaneous and authentic reflection and relaxed writing (Deng & Yuen, 2011; Prinsloo et al., 2011) but writing in a non-structured blog can lack focus, a critical mindset and concentration, and not be conducive to learning (Boud & Walker, 1998).

There are some limitations to using blogs for promoting reflection. Studies have revealed that interaction, communication and sharing are not suitable for everyone (Duarte, 2015). In addition, some learners are strong in written reflection, while others excel in the verbal form of reflection (Lee, 2005). Therefore, some learners may avoid blogging but others may use the blog for reflection, sharing and collaboration (Petko et al., 2017). A lack of privacy has also been noted (Killeavy & Moloney, 2010; Yang, 2009), as being available to a broad audience can inhibit the expression of personal experience due to greater vulnerability (Holder, Sim, Foong, & Pallath, 2019; Wopereis et al., 2010). Research has also concluded that a lack of time for blogging hinders reflection (Killeavy & Moloney, 2010; Sun, 2010). Limited blogging activity can present another problem (Deng & Yuen, 2013; Stoszkowski & Collins, 2017; Wopereis et al., 2010), where only a core group contributes and the others mostly read (Stoszkowski & Collins, 2017). With regard to reading, it has been found that reading posts by others can promote learning (Chu et al., 2012; Ellison & Wu, 2008) and reflection (Deng & Yuen, 2011), but too many readers in online learning may affect participation (Fung, 2004) and through this reflection in the blog. There are also other factors that facilitate or hinder reflection and should be taken into consideration. The following outlines the characteristics that may affect learner reflection in an online environment such as a blog.

2.2.2 Characteristics affecting learner reflection in online environment

Many characteristics could affect learner reflection. Having an awareness of the factors that promote reflection helps improve reflective practice (Yu & Chiu, 2019). Researchers have highlighted the lack of studies in higher education as well as the need to identify the factors that affect learner reflection in a blog (e.g. Jones & Ryan, 2014; Yu & Chiu, 2019). Therefore, the current dissertation also addresses the findings about online discussion forums, portfolios and online learning environments due to their similarity to blogs (Ellison & Wu, 2008; Tang, 2013); and also focuses on the factors that may influence participation in online learning because reflection among learners may influence by participation in a blog (e.g. Boulton & Hramiak, 2012; Tang, 2013).

Based on studies in the field, the characteristics that may affect reflection in a blog can be divided into three areas (see Figure 1): characteristics of learners and their blogging (e.g. Avci & Askar, 2012; Guadagno et al., 2007; Yu & Chiu, 2019); characteristics of the blog group and group blogging (e.g. Barclay et al., 2018; Chen et al., 2009; Nambiar & Thang, 2016); and characteristics of tutor blogging (e.g. Biberman-Shalev, 2018; Mann, Gordon, & MacLeod, 2009; Szabo & Schwartz, 2011).

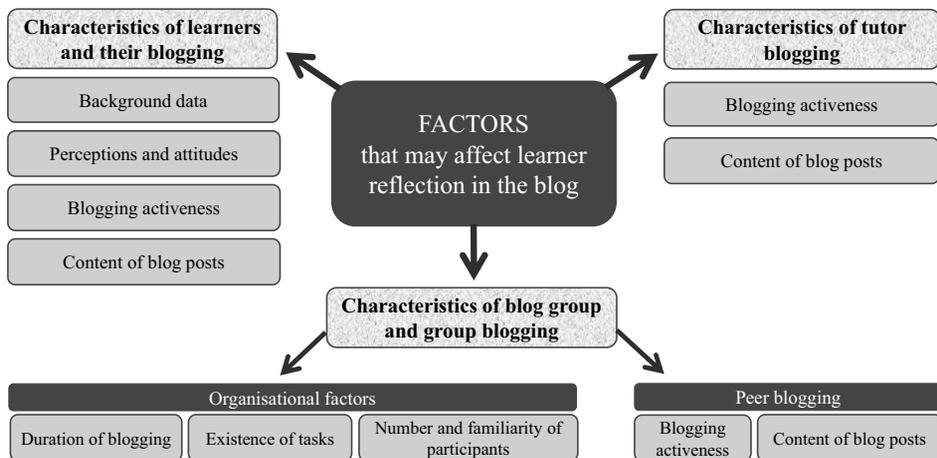


Figure 1. Distribution of characteristics that may affect learner reflection in a blog

The characteristics related to learners and blog groups that may affect reflection are described in more detail in articles II and III. The characteristics related to tutors blogging are described specifically in articles II and IV. A brief overview of the results of looking at different characteristics that may affect learner reflection and participation in online learning are presented below.

Characteristics of learners and their blogging

Characteristics of learners can affect blogging (Guadagno et al., 2007) and reflection in a blog (Papastavrou et al., 2016). The characteristics of learners and their blogging that may affect the use of the blog and learner reflection can be divided into learner background data, personal perceptions and attitudes, activeness and content of blog posts by the learners.

Learner background data, including age (e.g. Luik & Taimalu, 2016), technological skills (e.g. Cakir, 2013; Ciampa & Gallagher, 2015), previous blogging experience (e.g. Halic, Lee, Paulus, & Spence, 2010; Kuo et al., 2017) and stage of teacher training (Eisenschmidt, 2006; Poom-Valickis & Mathews, 2013), may affect reflection in the blog. Reflection in blogs can also be affected by **personal perceptions and attitudes** among learners. For example, seeing the value of using a blog (Avci & Askar, 2012; Ciampa & Gallagher, 2015), the perceived usefulness of blogging (Avci & Askar, 2012; Sadaf, Newby, & Ertmer, 2012), positive evaluations of the suitability of blogging (Luik & Taimalu, 2016) and positive attitude of blogging (Sadaf et al., 2012) may affect the use of blogs and through this also reflection.

Characteristics of learners' blogging, such as **activeness of learners in blogging** can be measured by the number of words in posts and the number of posts. Longer written texts (Chang, Chen, & Chen, 2012; Ottenberg, Pasalic, Bui, & Pawlina, 2016) and the frequency of blogging among learners (Boulton & Hramiak, 2012; Dos & Demir, 2013) promoted higher reflection in writing. Whereas the posts of learners who wrote less frequently were mainly descriptive (Boulton & Hramiak, 2012). It could be that very short writings may contain mostly descriptions, not deeper analysis in writings (Moon, 1999). Another blogging characteristic, **the content of learners' blog posts** is measured by the expression of positive and negative experiences, which is related to emotions. For example, Boud, Keogh and Walker (1985) and Gibbs' model of reflection (1988) have emphasised the importance of emotions in the reflection process. In addition, failures can reduce confidence in expressing problems, but successful experiences create positive feelings and self-confidence to discuss these experiences (Ellis, Carette, Anseel, & Lievens, 2014). In the context of a blog, Ferguson, Makarem and Jones (2016) recommended that when learners write blog posts they should include both positive and negative opinions, and that it is also important to share what did not go well. Failures can reduce confidence in expressing problems (Ellis, Carette, Anseel, & Lievens, 2014) and learners may be afraid of the attitude of others when sharing it. However, without expressing negative feelings, it could distort and hinder understanding (Boud, 2001). Successful experiences may increase motivation to learn (Boud, 2001) and create positive feelings and self-confidence to discuss these experiences (Ellis et al., 2014). In the context of a blog, Ferguson, Makarem and Jones (2016) recommended that when learners write blog posts they should include both positive and negative opinions, and that it is also important to share what did not go well.

Characteristics of the blog group and group blogging

Since communication and interaction with peers promotes individual learning and knowledge construction (Vygotsky, 1978), the online learning community has to be arranged so that learners can easily collaborate (Maor, 2003). The characteristics of a blog group and group blogging include duration of blogging, existence of tasks, and the number and familiarity of the participants. In addition, peer activities, such as activeness and content of blog posts can also individually affect a learner's blog use and reflection.

Duration of blogging may affect reflection because reflective blogging is time consuming (e.g. Morris et al., 2019; Spafford & Haarhoff, 2015). In addition, **tasks** (e.g. Cakir, 2013; Harland & Wondra, 2011) and questions (O'Hanlon & Diaz, 2010; Sturgill & Motley, 2014) may promote using the blog and reflection. The impact of tasks on blog use and reflection is discussed in more detail in subchapter 2.2.1. *Supporting reflection in the blog*. A smaller **number of participants** (Al-Fadda & Al-Yahya, 2010; Andersen & Matkins, 2011) and **familiarity of participants** (e.g. Deng & Yuen, 2013; Smidt, Wheeler, Perelta, & Bell, 2018) may also have an impact on the use of the blog and reflection.

Group blogging characteristics, such as greater **activeness** in the blog promotes their reflection (Kuo et al., 2017; Nambiar & Thang, 2016) and the use of the blog (Deng & Yuen, 2013; Tang & Lam, 2014). Furthermore, reading others' blog posts encourages learners to write their own posts (Spafford & Haarhoff, 2015) and the written texts of one learner with greater reflection promotes greater reflection in the other learners (Sturgill & Motley, 2014). Accordingly, the behaviour of peers in an online environment may function as an example for other learners (Sturgill & Motley, 2014). **The content of peers' posts** is important to consider in using blogs to support reflection. Learners should share experiences and feelings in their posts in order to promote communication (Blau, Mor, & Neuthal, 2009) and the posts should include both success and failure experiences in supporting each other (Groißböck, 2012). Reflecting on failures may help to learn and learning from mistakes may be more positive experience with peers (Marshall, Scott, & Wan, 2021). Studies have found conflicting results on the effect of peer comments on reflection. On the one hand, learners' comments on their peers' blog posts can encourage reflection (Ferguson et al., 2016; Stoszkowski & Collins, 2017). On the other hand, peer comments in a blog may not promote learner reflection (Harland & Wondra, 2011; Xie et al., 2008), while giving comments to others is beneficial in improving a learner's own critical thinking (Chen et al., 2009).

Characteristics of tutor blogging

Using technology is not effective without the effort of tutors (Mann et al., 2009; Duarte, 2015) because a tutor in online learning is important in promoting reflection among learners (Byington, 2011; Maor, 2003; Kuo et al., 2017). The characteristics of tutor blogging that may affect reflection in a blog can include activeness and the content of the blog posts.

Activeness of a tutor is measured by the number of written texts, including the number of comments. An active tutor may positively affect learner reflection in online discussions (Ali, Sukri, Tahir, & Said, 2017; Lim & Cheah, 2003; Sheridan & Kelly, 2010); however, it has also been observed that learners can feel comfortable in online discussion when the tutor is passive (Hurt et al., 2012) and the number of tutor responses is not related to the learners' final reflection scores (Harland & Wondra, 2011).

Content of the tutors' writing is highlighted to promote reflection. Asking questions (e.g. Biberman-Shalev, 2018; Szabo & Schwartz, 2011) may promote reflection in online discussions, but it is important to design questions in such a way that they can affect learner thinking (Chen et al., 2009); however, when questions were more generally about the practice and less personal, these encouraged discussion among learners (Guldberg & Pilkington, 2007). It is also worth noting that demonstrations of reflection by the tutor promoted reflection among learners (Jones & Ryan, 2014; Szabo & Schwartz, 2011). Tutors could provide examples of appropriate and high-quality blog posts to promote reflection (Harland & Wondra, 2011), give examples of quality reflection and direct other learners to look at a learner's forum post with a high level of reflection as an example (Chen et al., 2009). In promoting online discussion, tutors should guide learners to share experiences (Chen et al., 2009; Szabo & Schwartz, 2011) and promote peer support, and not only share their own knowledge (Dalgarno et al., 2015) to promote reflection. Tutors can raise interesting discussion topics that may promote learner participation (Byington, 2011; Zhang, Zhang, Zou, & Huang, 2018) and discuss successful and unsuccessful experiences in order for participants to learn from the situation (Ellis et al., 2014). Providing feedback by the tutor is important in online learning (Lim & Cheah, 2003; Nandi, Hamilton, & Harland, 2012; Sheridan & Kelly, 2010; Yu & Chiu, 2019), but here it is important to monitor the content of feedback. For example, tutor comments without any guidance support the social atmosphere in a blog but not reflection among learners (Jones & Ryan, 2014).

In summary, reflection in the blog may depend on different characteristics that are related to learners, blog groups and tutors. However, the findings on the effect of different characteristics on reflection are contradictory, and there is insufficient research on the potential of a blog environment to support reflection. The effect of the background of learners and the content of peers' and tutors' posts on learner reflection requires further research. Learner blogging activity and the content of written texts have not been sufficiently investigated and require more research in order to support reflection in a blog. The tasks in a blog can have variable effects on reflection and it is important to decide which tasks and guidance learners need to support reflection in a blog. It is also necessary to choose the methods for assessing learner reflection when using blogs and these methods are presented below.

2.2.3 Assessing reflection when using blogs

Studies have suggested various options for assessing reflection among learners. In the following, the main focus is on two options as the most widely used methods to assess reflection – content of written texts (Kori et al., 2014; Sim & Hew, 2010) and self-report scales (Sim & Hew, 2010). These methods were used in this dissertation to assess written reflection in the blog and learners' general evaluations of using reflection before and after blogging.

Assessing reflection based on the content of written texts provides detailed information about the quality of learner written reflection (Poldner et al., 2014). Reflections in written form may be objective (Kember, McKay, Sinclair, & Wong, 2008) and an authentic part of reflection that enables us to follow what learners actually write (Tang, 2013). The assessment of reflection should be based on a process that enables us to ascertain at which levels of writing learners reflect (Kember et al., 1999); for example, applying reflection models (Kember et al., 1999; Moon, 2007). Gibbs' reflection model is one of the commonly used models for assessing learner reflection (Holder et al., 2019) because it includes a clear structure (Adeani et al., 2020), a cycle of questions that support written reflection (Ahmed, 2019; Husebø, O'Regan, & Nestel, 2015) and helps ascertain the stage of the reflection (Tawanwongsri & Phenwan, 2019). There have been different approaches to using Gibbs' model in assessing reflection. For example, whether all stages of this model are present in the learner's written texts (e.g. Adeani et al., 2020) and which is the highest stage of reflection that learners attain in order to monitor whether lower or higher stages of reflection are more prevalent (Tawanwongsri & Phenwan, 2019). Similarly, determining which stages of Gibbs' model are reflected in sentences used in reflective journal writings (Choo, Abdullah, & Nawi, 2018). In the present dissertation, the highest stage of reflection in blog posts was found based on Gibbs' model to find out which characteristics affect the stage of reflection in learner writing.

In terms of the disadvantages of content analysis, the characteristics to be encoded must be identified based on the theory, existing studies and the environment. Training encoders is also an important consideration for the reliability of the results, and the time required for the entire analytical process has to be taken into consideration (Rodriguez, 2014). Content analysis only makes it possible to assess written reflection, which depends on how much the learner can or is motivated to write. Therefore, it would be useful to also use other instruments (e.g. self-report scales) to assess other aspects of reflection.

Several self-report scales have been applied to assess learner reflection (e.g. Eutser & Curcio, 2019; Kember et al., 2000; Sobral, 2001). Using reflection scales makes it possible to assess reflection generally, not focusing on a certain method of reflection. In particular, self-report scales measure the learner's own evaluations of reflection, and it is not clear whether the learner is able to evaluate their own verbal, mental or written reflection. The characteristics of reflection scales have been derived from different theoretical bases and reflection subscales (for more details, see article I).

Several authors have relied on the constructivist approach when compiling self-report scales; for example, Reflection in Learning Scale (Sobral, 2001), Reflection Questionnaire (Kember et al., 2000) and Reflective practice questionnaire (Priddis & Rogers, 2018). Researchers have concluded that the Reflection Questionnaire (Kember et al., 2000) and Reflection in Learning Scale (Sobral, 2001) are suitable to measure reflection because the reliability and validity of these scales have been confirmed by authors (Mann et al., 2009) and used in high-quality studies (Williams et al., 2019). Although these scales are designed to study reflection in the field of medicine, the researchers have also emphasised the measurement of reflection in other disciplines (Kember et al., 2000; Sobral, 2001). Hence, the Reflection Questionnaire and Reflection in Learning Scale is used in this study, since these should allow reflection to be successfully assessed in teacher education.

There are also limitations to using scales to assess reflection. For example, the nature of questions about perception is subjective (Nelson, 2008), which is often a problem in self-reported questionnaires. The ceiling effect has also been previously indicated as an assessment limitation when using self-report scales (e.g., Petko et al., 2017; Taylor, 2012).

Some researchers have suggested using a combination of different instruments (e.g. Killeavy & Moloney, 2010; Pinya & Rossello, 2016; Tang, 2013) to study reflection as a complex phenomenon (Williams et al., 2019). For instance, Gibbs' model has been used to measure the content of essays, supplemented by a questionnaire to identify learner knowledge and beliefs about reflection and their honesty in reflection (Maloney, Tai, Lo, Molloy, & Ilic, 2013). Combining different instruments is helpful for a more comprehensive assessment of reflection and provides a broader picture of learner reflection (Williams et al., 2019). In this study, written reflection is assessed using content analysis, and general evaluations of the use of reflection are assessed using reflection scales in order to obtain more comprehensive information about reflection when using blogs during the teaching practice and induction year.

3. RESEARCH METHODOLOGY

The methodology chapter provides an overview of the research design, ethical considerations, the sample, the data collection and data analysis. The dissertation contains four articles in which two different data collection methods and several quantitative data analysis methods were used (see Table 2).

Table 2. Research questions, sample, data collection, data analysis and published articles of the dissertation

Research question	Sample	Data collection	Data analysis	Article
1. How characteristics of participants' activeness and blog groups are related to changes in learners' evaluations of using reflection based on questionnaires?	216 student teachers and induction year teachers	Pre-questionnaire	Confirmatory factor analysis (CFA), exploratory factor analysis (EFA)	I
2. What characteristics of learners and their blogging predict written reflection in blog posts based on the Gibbs model?	169 student teachers and induction year teachers	Pre- and post-questionnaires, blog posts	Quantitative content analysis; Spearman correlation; Kruskal-Wallis test; Mann-Whitney U-test	II
3. What characteristics of a blog group and group blogging predict written reflection in blog posts based on the Gibbs model?	166 student teachers and induction year teachers	Pre- and post-questionnaires, blog posts	Quantitative content analysis; Multiple regression analysis	III
4. What characteristics of tutors' blogging predict written reflection in blog posts based on the Gibbs model?	207 student teachers and induction year teachers 29 tutors	Pre-questionnaire, blog posts	Quantitative content analysis; Multiple regression analysis	IV

3.1 Research design

This dissertation is related to the EDUCO joint research project “Teacher professional development and its maintenance”, conducted from 2010 to 2013 by the University of Tartu and Tallinn University. One of the sub-topics of the project focused on identifying options for using blogs to improve teacher education and the induction year in teacher training by examining possibilities to support learner communication and reflection skills in a blog (Krull, Leijen, Lepik, Mikk, Talts, & Õun, 2013). The author of this dissertation participated in all stages of the research project as a member of the research group for this sub-topic. Learners were taught reflection skills (e.g. according to Gibbs’ model) during the teacher education courses. Accordingly, the goal of the research group was to create an environment for learners to interact, share experiences and reflect, but not to directly teach reflection. A similar approach has been used in a previous study, where learners had first been taught reflection skills and a blog was then used as an interaction platform to support reflection without explicit instruction and guidance (Killeavy & Moloney, 2010).

The dissertation consists of one study including two stages of data collection. The research group prepared 13 collective blogs in the 2010/2011 academic year (first stage of the study) and 17 blogs in the 2012/2013 academic year (second stage of the study) before the teaching practice and induction year. The process of conducting the study in two stages was similar and it is shown in Figure 2. The activities and the process of the study are more specifically described in article III.

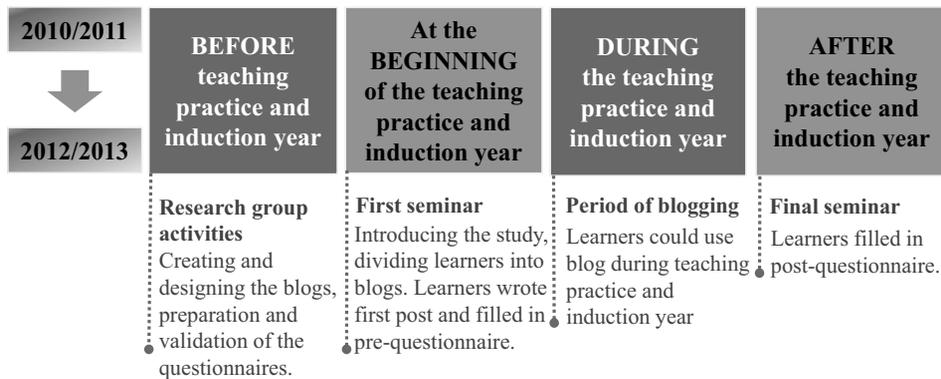


Figure 2. The process of the study

The learners were told the purpose of using a blog was to offer an opportunity to share experiences related to the teaching practice and induction year, to communicate with other participants, to reflect and to ask for help. At least one member of the research group was present in each blog to support the use of the blog and reflection among the participants. The author of the dissertation was also a member in several of the blogs. The role of the members of the research group

was to help learners with the technical use of the blog, provide them with writing support, ask questions to promote communication and reflection, and answer questions and solve problems about the teaching practice and induction year. In some blogs the university supervisor of the teaching practice or mentor of the induction year were present to support the blog members' blog use and reflection. They had similar tasks as the members of the research group. In addition, university supervisors and mentors could assign tasks in the blog to support learner reflection skills. Figure 3 shows the structure of the blog environment used in the study. The features of the blog environment in the context of this study are described in more detail in article III.



Figure 3. Structure of the blog environment

The blogs were designed under particular conditions (hereafter referred to as characteristics of the blog group). The characteristics of the blog group are described in chapter 3.4 *Data collection*.

3.1.1 Ethical considerations

Several ethical principles were followed in conducting the current study according to the guidelines of the British Educational Research Association (2011) for educational researchers and the Estonian Code of Conduct for Research

Integrity (Eesti Teadlaste Eetikakoodeks, 2002) for Estonian scientists. Considering the ethical requirement of informed consent and willingness to volunteer, the purpose of the study was introduced to the participants in the first seminar. Also, using a blog was voluntary and the participants chose to write in the blog if they wanted to share or ask something of others. According to the ethical requirements of confidentiality, anonymity and publication on the internet, the blog was available only to the members of the blog and was not accessible to other people outside of the current study. In addition, the participants did not have to use their real names and could use a nickname or pseudonym to maintain anonymity in the blog. In addition, the participants were asked not to use the real names of other learners, students, schools and teachers in the blog.

3.2 Sample

The sample consisted of student teachers, induction year teachers, supervisors, mentors and members of the research group. The convenience sampling technique was used to give a chance for every student teacher, induction year teacher and tutor from the two Estonian universities to participate.

There were 448 student teachers and induction year teachers who started their teaching practice or induction year in the 2010/2011 and 2012/2013 academic years at the University of Tartu or Tallinn University and who participated in the study. More specifically, there were 216 participants in the first stage and 232 participants in the second stage of the study. They represented different subjects and school levels, including pre-school teachers, primary school teachers, subject teachers and special educationalists. Descriptive statistics about the learners are presented in Table 3 for each of the articles. Only learners from the first stage of the study were included in articles I and II, while articles III and IV included learners from both stages of the study.

Table 3. Description of the sample of learners by articles

Article	Student teachers	Induction year teachers	Total sample	Female	Male	Average age (SD)
I	127 (58.8%)	89 (41.2%)	216	206 (95.4%)	10 (4.6%)	25.04 (5.7)
II	101 (60.0%)	68 (40.0%)	169	159 (94.1%)	10 (5.9%)	25.08 (5.27)
III	96 (57.8%)	70 (42.2%)	166	156 (94.0%)	10 (6.0%)	25.19 (4.9)
IV	112 (54.0%)	95 (46.0%)	207	192 (93.0%)	15 (7.0%)	25.3 (5.0)

There were some criteria for selecting learners for the different articles of the study. The sample for article I included the respondents to the pre-questionnaire (see details in article I). The sample for article II and III consisted of participants who responded to both the pre- and post-questionnaire (see articles II and III). The sample for article IV included respondents to the pre-questionnaire (see article IV for more information). In addition to completing the questionnaires, another criterion for inclusion in articles III and IV was having posted more than one blog post, so that only bloggers could participate in the study.

The study involved 29 participating members of the research group, university supervisors and mentors of induction year teachers. All the university supervisors were university teacher educators, but the mentors of induction year teachers were divided between university teacher educators and in-service teachers. In total, 15 university teacher educators including members of the research group, and 14 in-service teachers participated in this study. Since the tasks of the members of the research group, supervisors and mentors were similar, they are all referred to as “tutor” hereinafter. The tutors included 26 female and 3 male individuals, with ages ranging from 26 to 60. Article II only included 9 tutors who participated in the first stage and article IV involved all 29 tutors who participated in the first or in the second stage of the study.

3.3 Data collection

All the data were collected with the purpose of finding out which characteristics are related to reflection when using blogs. The selection of different characteristics for this study was based on previous findings and theoretical considerations discussed above. At the beginning of the teaching practice and induction year, learners completed the pre-questionnaire, and then later also the post-questionnaire. The questionnaires were used to collect data about learners’ attitudes, evaluations, perceptions and background information. During the teaching practice and induction year, learners and tutors participated in collective blogs and the data about blogging were gathered. In addition, the research group established several characteristics when they divided the participants between collective blogs, and therefore data were also determined from a range of collective blogs with different set-ups. The gathered data was divided into three groups to find out how different characteristics affect learner reflection. These are characteristics of learners and their blogging, characteristics of the blog group and group blogging, and characteristics of tutors’ blogging. The distribution of the characteristics among groups are presented in Table 4 (see more detailed information about the characteristics in articles I and III).

Table 4. Characteristics related to learners, blog groups and tutors

Characteristics among groups	Learners	Blog group	Tutors
Attitudes in using face-to-face and electronic communication (Warschauer, 1996) ¹	X		
Background information (<i>e.g. age, computer skills</i>) ¹	X		
Stage of teacher education (<i>student teacher or induction year teacher</i>)	X		
Questions about blogging experience (<i>e.g. blogging was suitable</i>) ¹	X		
Writing about success and problems (<i>e.g. successful or failure experiences</i>) ²	X	X	X
Blogging activeness (<i>number and length of blog posts</i>) ²	X	X	X
Eight types of behaviour in blog (<i>e.g. sharing information, proposing questions</i>) ²			X
Four levels of collectivity of posts (<i>individual to supporting learning community</i>) ²			X
Number of participants in the blog (<i>5–24*</i>) ³		X	
Number of participants posted > 1 (<i>0–23*</i>) ³		X	
Level of familiarity between learners (<i>e.g. strangers, course mates</i>) ³		X	
Task in the blog ³		X	
Length of the blogging period in weeks (<i>5–35*</i>) ³		X	

¹Data gathered from questionnaires

²Data gathered from blog posts

³Determined from blogs with different set-ups

*Minimum and maximum

The characteristics of learners and their blogging were used to answer the first (article II) and second (article III) research question of the study. The characteristics of blog group and group blogging were used to answer the first (article II) and third (article III) research question of the dissertation. And the characteristics of tutors' blogging were used to answer the fourth research question of this study (article IV). These articles cover the characteristics related to learners, blog groups and tutors in more detail.

A coding manual was developed and used by the research group to encode the content of the blog posts by learners and tutors (an excerpt from the coding manual is provided in Appendix 1). The process of developing the coding manual is discussed in more detail in article III. The coding manual included categories that are necessary to encode the research data (Bock, Isermann, & Knieper, 2012). Encoding the text means the enumeration of content that allows describing and analysing the text (Brewer, 2003). Qualitative content can be analysed quantitatively (Neuendorf, 2019), where the characteristics of the text are categorised or assessed numerically (Krippendorff, 2004). Therefore, data from the blog posts was collected using the coding manual, where some of the data was originally obtained in quantitative form (e.g. number of blog posts and number of words). The other part of the data required reading content of the blog posts. According to the content of the text, a numeric code was assigned based on the coding manual. For example, activities of tutors' blog posts were represented with different variables (e.g. own experiences, instructions, proposing questions, answering questions, support, agreement, opposing etc), where activity was coded with 1 in the case this activity was found in the tutors' post and with 0 in the case this activity was not represented in the tutors' post. It is important to identify the unit of analysis when using the coding manual (Bock et al., 2012). In the current study, 'segment' was used as a unit for assessing the content of blog posts, and it could be a whole post or part of a post about the same topic (not including characteristics of blogging activeness that were collected per each new post and comment).

3.3.1 Assessing reflection

The data about learner reflection was derived from blog posts and two reflection scales, which were collected about each learner. Using different instruments to study reflection may give a more diverse overview of learner reflection (Williams et al., 2019) and whether blogging supports different types of reflection – written reflection and evaluations of using reflection generally. This, in turn, provides an insight into the suitability of the assessment methods in the context of blogging.

Content analysis was used to assess the written reflection from the blog posts of learners and tutors during the teaching practice and induction year. Specifically, the highest stage of reflection was determined in each segment of a new post or comment based on Gibbs' model of reflection (1988). Gibbs' model was selected because it has been used in the teacher education programme in Estonia from 2010 to 2013 to enhance learner reflection skills. Other studies have also used the Gibbs model to determine the highest stages in written texts (Choo et al., 2018; Tawanwongsri & Phenwan, 2019). Some blog posts were without reflection and only included short answers or questions; therefore, an additional stage, labelled "Nothing", was added to Gibbs' original model. The stages of Gibbs' model of reflection and coding examples of blog posts for each stage are shown in Table 5.

Table 5. Stages of Gibbs' model of reflection (1988) and coding examples of blog posts

Stage (code)	Example of encoding blog post
Nothing (0)*	<i>Yes!</i>
Description (1)	<i>Today I observed an Estonian language class. It was so exciting to observe, I get some new ideas every time. But in the meantime, when the kids do some written work, it gets boring...</i>
Feelings (2)	<i>The experience as a teacher has been very positive. The work of a teacher has been full of excitement and surprises. The children are very nice and cooperation with them has gone very well...</i>
Evaluation (3)	<i>Today I somehow got a lazy guy to work. After all, he was scared to know that next week would be a test. Anyway, when he started to realise and his tasks were solved, he also had an experience of success. I had to help him a lot. But it was good to see that he would finally take part.</i>
Analyse (4)	<i>I wrote about such a topic here some time ago. Today, I can say that things have improved. I gave up my negative feelings about the boy – he interferes in the lessons and I can't handle him. Why can't you do it? I can do it!! The school psychologist talks to the boy regularly, as does the class teacher and me and the boy's mother...</i>
Conclusion (5)	<i>Do you think that such a thing would be appropriate, if the lesson is very noisy and the students do not obey my orders, then I will tell them that unfortunately we have to follow the lesson now because of your behaviour (after the lesson, of course) and I really go and will I do this with them again after lessons exactly as I had planned? Could such a thing be allowed?</i>
Action plan (6)	<i>However, the practice has shown me that I want to be a teacher of humanities in the future, but not in the 5th grade, maybe not in the 6th grade, but certainly in the 7th grade, and I would definitely like to try to teach in high school as a real teacher.</i>

*This stage, which was not included in the original model of reflection, was added in this study.

However, the written texts provide information about the quality of the learners' written reflection (Poldner et al., 2014) and what learners actually write in their reflections (Tang, 2013). Hence, the blog posts only assess written reflection, but it is also possible to reflect verbally or in one's thoughts. In addition to written reflection, this study sought to assess whether the use of blogs has any relationship to reflection more generally. Therefore, self-report scales were used to assess the learners' evaluations of reflection generally, not focusing on the manner of the reflection. When planning the study, the researchers did not find any validated scale for use in the Estonian context. The research group analysed different reflection scales (see more in article I) and based on the analysis, the following two scales were selected, adapted and used for Estonian conditions.

The Reflection Questionnaire (Kember et al., 2000) and Reflection In Learning Scale (Sobral, 2001) were employed in the study because these scales assess aspects of reflection that are considered important in teacher education. In addition, the aim was to assess changes in reflection during the teaching practice and induction year that can be determined by these scales (Kember et al., 2000; Sobral, 2001). As learners in teacher education are expected to reflect, including critically reflect, the *Reflection Questionnaire (Kember et al., 2000)* was chosen. This scale allows us to investigate how learners evaluate their own use of reflection and critical reflection in general activities, and whether these evaluations change during teaching practice and the induction year. Hence, only the reflection and critical reflection subscales of the questionnaire were used in this study (non-reflective subscales were omitted). As the teaching practice and induction year involves continuous learning, the *Reflection in Learning Scale (Sobral, 2001)* was selected to assess learner self-evaluations on the use of reflection in learning, as well as assessing any changes in this perceived use during the teaching practice and induction year. A more detailed description of the two reflection scales is provided in articles I and III.

3.3.2 Reliability and validity of reflection scales

In order to adapt the Reflection Questionnaire and Reflection in Learning Scale to the Estonian context, the process of translating, assessing the suitability of the items and a pilot study were carried out (see more detail in the Article I). A confirmatory factor analysis (CFA) with estimates of generalised least squares was applied to the adapted Reflection Questionnaire (Kember et al., 2000) and Reflection in Learning Scale (Sobral, 2001) in order to test their validity for use in the Estonian context. The following model fit indices were selected for the CFA by the researchers to assess whether the models fit the actual data: chi-square with its degrees of freedom (CMIN): <3.0 (Hu & Bentler, 1999), root mean square error of approximation (RMSEA): ≤ 0.08 (Browne & Cudeck, 1993) and goodness of fit index (GFI): ≥ 0.95 (Brown, 2006; Hu & Bentler, 1999). In addition, factor loadings (greater than 0.3 according to Dawson, 2017; Field, 2009) and factor residuals were examined to decide whether the variables fit into the factor. In addition, a reliability analysis was conducted, and a Cronbach's alpha >0.7 was considered acceptable (Dawson, 2017; Muijs, 2011).

The results of the CFA confirmed a two-factor structure (reflection and critical reflection) for the Reflection Questionnaire (Kember et al., 2000) as indicated in earlier studies (Kember et al., 2000; Leung & Kember, 2003). The internal reliability values of the reflection ($\alpha = 0.77$) and critical reflection subscales ($\alpha = 0.70$) were also acceptable (Dawson, 2017; Muijs, 2011) and similar to previous studies (Kember et al., 2000; Leung & Kember, 2003). The shortened Reflection in Learning Scale (Sobral, 2001) showed one second-order factor structure (based on 10 items) called reflection in learning. A similar model of Reflection in Learning Scale with a one-factor structure has been found previously (Sobral,

2001). The internal reliability values of the Reflection in Learning Scale were acceptable ($\alpha = 0.84$), which has also been shown in earlier studies (Sobral, 2000, 2001, 2005). In addition, the CFA allows for the evaluation of convergent and discriminant validity (Dawson, 2017), which were confirmed in these scales. In summary, the Reflection Questionnaire and Reflection in Learning Scale may be valid and reliable in order to assess reflection among student teachers and induction year teachers in the Estonian context. The process and indicators for analysing the validity and reliability of the two reflection scales have been described in more detail in article I.

3.4 Data analysis

The data from the questionnaires, blog posts and blogs were analysed. An overview of the data analysis for the study is shown in Figure 4 and is described in more detail below.

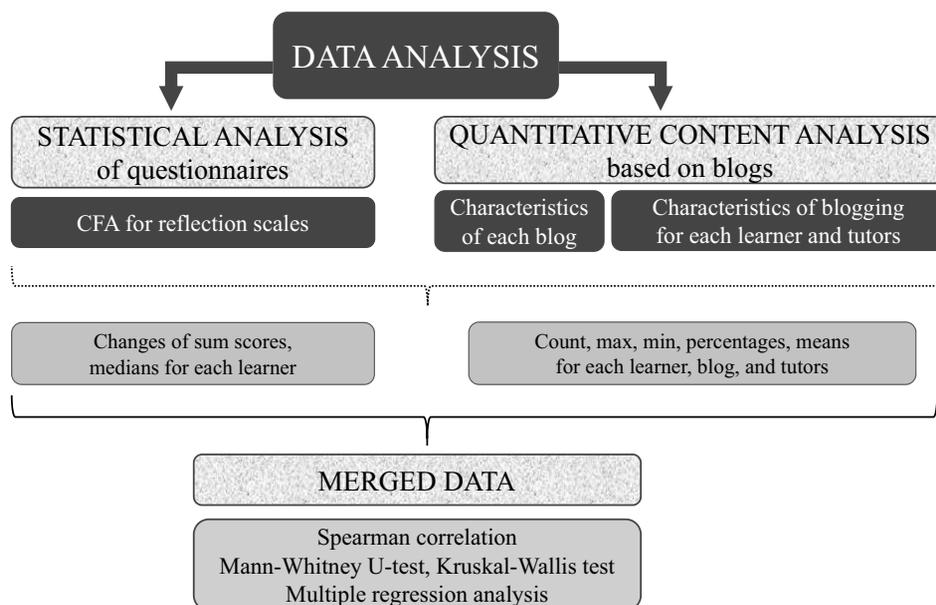


Figure 4. Data analysis for the study

The programs SPSS Statistics 18 and 25 were employed for descriptive statistics, correlation analysis, comparison analysis and regression analysis. The program LISREL 8.8 was used for the CFA.

3.4.1 Analysis of questionnaire data

All the data from the pre- and post-questionnaires were entered into MS Excel and also imported into LISREL to conduct the CFA to estimate the dimensionality, reliability and validity of the scales (Furr, 2013). The results of the CFA are described in more detail in subchapter 3.3.1. *Assessing reflection* and in article I. Based on the CFA results, the sum scores of the reflection subscales were calculated for each learner separately for the pre- and post-questionnaires. To calculate the changes in the learners' evaluations of using reflection, the post-questionnaire results were subtracted from the pre-questionnaire results. In addition, the medians of the reflection and communication style subscales were calculated for each learner to analyse how learner evaluations of using reflection and attitudes towards communication predict reflection in the blog.

3.4.2 Analysis of blog post data

Based on the data from blog posts (including new posts and comments), several characteristics of blogging from learners, blog groups and tutors were determined and calculated. Descriptive statistics of blogging activeness (e.g. number of blog posts and number of words) were calculated per blog post and then also for the characteristics related to the content of the blog posts (e.g. success and problems, level of tutor collectivity) for each segment. Details of the calculated data can be found in articles III and IV. Since the characteristics affecting reflection can be divided into three groups, the sum indices of these groups were analysed differently. The sum indices for blogging were calculated individually for each learner based on new posts and comments posted individually by each learner. The sum indices for the blogging by tutors were calculated per blog. It was not important to individually identify tutors because all tutors in the blogs had similar tasks and this study determined how their behaviour in a blog generally predicted learner reflection. The sum indices for numerical and content characteristics of blogging for each blog group were calculated based on the individual blogging data for learners in one blog.

3.4.3 Analysis of relationships between different characteristics and reflection

To find relationships between reflection and different characteristics related to learners, blogs and tutors, the data must be analysed all together and on an individual basis. Accordingly, the data from the pre- and post-questionnaires were matched to the calculated data of blogging among learners, blog groups and tutors, as well as the characteristics of the blog groups. A Spearman correlation was used to identify relationships between continuous and ordinal data. Non-parametric tests, such as the Kruskal-Wallis Test, were applied to compare the

ordinal data of three groups, and the Mann-Whitney U-Test was used to compare the ordinal data of two groups (see more in article II).

To determine which characteristics related to learners, blog group and tutors predict learner reflection in blog posts, the stepwise multiple regression analysis was used. This contributes to measuring the combined effect of several factors on one factor. In combination, each factor shows an individual influence on the dependent factor, when the values for the other independent factors do not change (Field, 2009; Tooding, 2015). The stepwise method is an exploratory technique that is governed by mathematical criteria, but not the theoretical background (Field, 2009). Many of the characteristics analysed were similar in nature, though different in content (e.g., new posts and comments), and therefore the stepwise multiple regression analysis was applied in this study. The dependent variable in the regression analysis was the stage of reflection, which was calculated as an aggregate variable from the average stage of reflection. The model fit was assessed using the value of the coefficient of determination (R Square): >0.1 poor fit, 0.11–0.3 modest fit, 0.31–0.5 moderate fit, <0.5 strong fit (Muijs, 2011); F-statistic: $p < 0.05$ (Field, 2009), standardised regression coefficient β (Beta) and t-statistics. In a multiple regression analysis, independent variables should not be strongly (>0.8) related to each other (Nishishiba, Jones, & Kraner, 2017). Accordingly, the variance inflation factor (VIF), tolerance statistic and correlation matrix were used to evaluate multicollinearity. The Kolmogorov-Smirnov Test was used to check the normality of the distribution of standardised residuals, and the values of skewness and kurtosis were found to check the normal distribution of the data. The exact regression models with indicators are presented in articles III and IV.

4. FINDINGS

The findings chapter presents a summary of the results for the first, second, third and fourth research questions of the dissertation. More detailed results are presented in the articles (II–IV).

4.1 The relationship between changes in learner evaluations of using reflection and the characteristics of participant activeness and blog groups

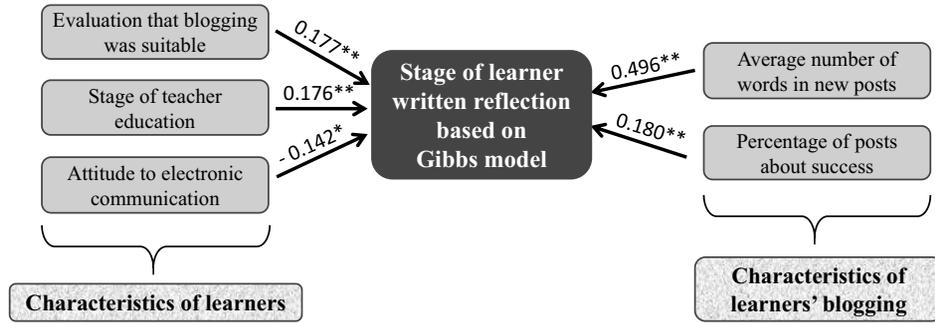
This subchapter deals with the first research question: How are the characteristics of participant activeness and blog groups related to changes in learner evaluations of using reflection based on the questionnaires? Correlation analysis showed that activeness (*number of new posts by tutor*) was negatively related to changes in learner evaluations of reflection ($\rho = -0.30, p < 0.01$) and critical reflection ($\rho = -0.26, p < 0.05$). Changes in learner evaluations of reflection in the learning subscale did not show a significant correlation with the number of new posts by tutor ($\rho = -0.19, p > 0.05$). Among the characteristics of learners and their blogging, the results showed that there were no significant correlations between changes in learner evaluations of reflection and the characteristics of learner activeness (absolute values of ρ ranged 0.1–0.12, $p > 0.05$). Similarly, an analysis of the characteristics of blog groups and group blogging revealed that there were no significant correlations between changes in learner evaluations of reflection and the characteristics of group activeness (absolute values of ρ ranged 0.02–0.16, $p > 0.05$) and no significant differences between different blog set-ups ($\chi^2 = 0.00–4.89$; $U = 2721.0–3378.0$; $p > 0.05$).

Altogether, two significant correlations between changes in learner evaluations of reflection and the characteristics of tutors' blogging were found. Correlations and differences were not found between other blogging characteristics among learners, blog groups and tutors and changes in learner evaluations of reflection. More detailed results can be found in article II.

4.2 Characteristics of learners and their blogging predicting reflection in blogs

This subchapter responds to the second research question: What characteristics of learners and their blogging predict reflection in blog posts based on the Gibbs model? The regression model ($F(5, 150) = 21.826, p < 0.000$) with R Square 0.421 showed that five characteristics of learners and their blogging described 42.1% of the total variance of the dependent variable. *Average number of words in new posts* as a characteristic of activeness was the strongest predictor of the average

stage of learner reflection in new posts. The variable *attitude to electronic communication*, negatively predicted learner reflection, while other characteristics had a positive impact. Figure 5 shows all the predictors, including the characteristics of learners and their blogging, that predicted learner reflection in blogs.



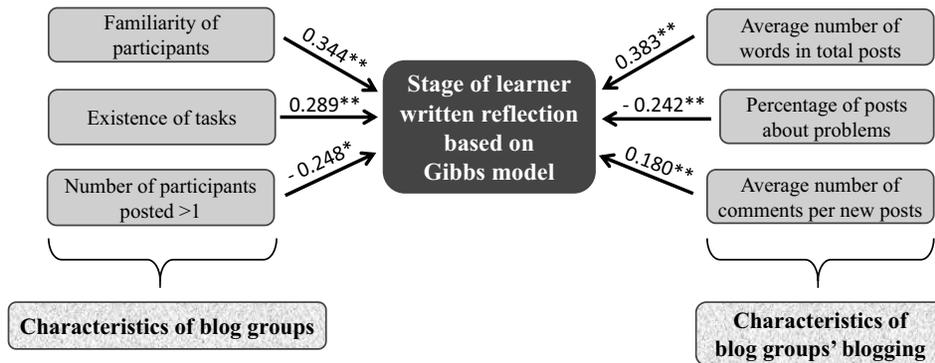
** $p < 0.01$, * $p > 0.05$

Figure 5. Characteristics of learners and their blogging with standardised Beta coefficients that predicted the stage of learner written reflection based on Gibbs model

The regression model did not show multicollinearity between independent variables (Tolerance values 0.872–0.969; VIF values 1.032–1.147) nor a statistically significant difference in the distribution of standardised residuals from the normal distribution (Kolmogorov-Smirnov Test, 0.053, $p > 0.05$). In conclusion, the findings showed that three characteristics of learners and two characteristics of blogging by learners predicted learner reflection in blogs. The precise model and descriptive statistics of the variables can be found in article III.

4.3 Characteristics of blog groups and group blogging predicting reflection in blogs

This subchapter responds to the third research question: What characteristics of a blog group and group blogging predict reflection in blog posts based on the Gibbs model? The regression model ($F(6, 159) = 11.801, p < 0.000$) with R Square 0.308 showed that six characteristics of blog groups and group blogging explained 30.8% of the total variance of the dependent variable. *Average number of words in total posts* as an activeness characteristic had the strongest effect on the average stage of learner reflection in new posts. The characteristic of activeness *number of participants that posted more than one post* and the characteristic on the content of blog posts *percentage of posts about problems* negatively predicted learner reflection. Other characteristics had a positive effect on learner reflection. Figure 6 shows all the characteristics of blog groups and group blogging that predicted learner reflection in blogs.



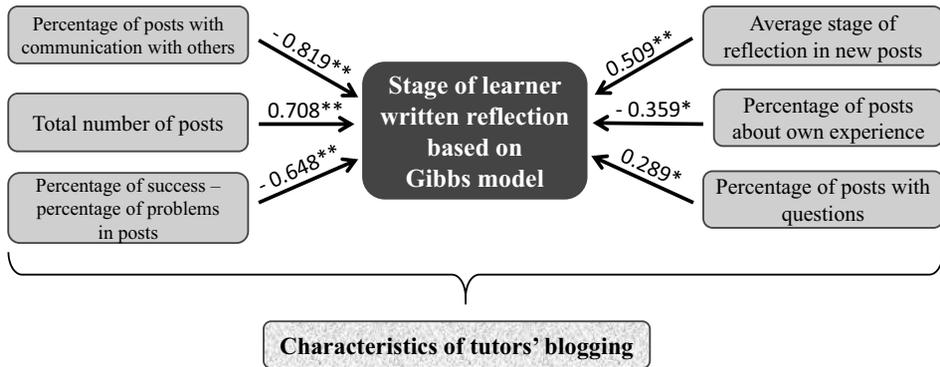
**p<0.01, *p>0.05

Figure 6. Characteristic of blog groups and group blogging with standardised Beta coefficients that predicted the stage of learner written reflection based on Gibbs model

The regression model did not show multicollinearity between independent variables (Tolerance values 0.426–0.943; VIF values 1.061–2.349) nor a statistically significant difference in the distribution of standardised residuals from the normal distribution (Kolmogorov-Smirnov Test, 0.035, $p>0.05$). All in all, three characteristics of blog groups and three characteristics of blog groups' blogging predicted learner reflection in blogs. The exact model and descriptive statistics of the variables have been presented in article III.

4.4 Characteristics of tutors' blogging predicting reflection in blogs

This subchapter responds to the fourth research question: What characteristics of tutors' blogging predict reflection in blog posts based on the Gibbs model? The regression model ($F = (6, 125) = 13.651, p<0.000$) with R Square 0.408 showed that six characteristics of tutors' blogging explained 40.8% of the total variance of the dependent variable. *Percentage of tutors' posts with communication with others* as characteristic of the content of blog posts was the strongest predictor of the average stage of learner reflection in new posts. There were three positive and negative predictors. Figure 7 shows the characteristics of tutors' blogging that predicted learner reflection in the blog.



** $p < 0.01$, * $p > 0.05$

Figure 7. Characteristics of tutors' blogging with standardised Beta coefficients that predicted the stage of learner written reflection based on Gibbs model

The regression model had no multicollinearity between independent variables (Tolerance values 0.168–0.729; VIF values 1.371–5.950) nor a statistically significant difference in the distribution of standardised residuals from the normal distribution (Kolmogorov-Smirnov Test, 0.045, $p > 0.05$). Altogether, six characteristics of tutors' blogging predicted learner reflection in the blog. The exact model and descriptive statistics of the variables have been presented in article IV.

5. DISCUSSION

In the current chapter, the findings will be discussed according to the four research questions of the dissertation. This study had three main directions – which characteristics related to learners, blog group and tutor promote learner reflection in the blog.

5.1 Learner characteristics and blogging that related to reflection

To answer the first and second research questions, the regression model showed that five characteristics of learners and their blogging predicted learner reflection based on the Gibbs model. These were average number of words in new posts, percentage of posts about success, evaluation that blogging was suitable, attitude towards electronic communication and stage of teacher education. Four of these characteristics had a positive effect and only a positive attitude towards electronic communication had a negative effect on reflection.

The most important variable affecting learner reflection in the blog was the length of the new posts followed by writing about success situations. Both of these are examples of the blogging characteristics of learners. Other studies have also found that longer written texts are related to reflection in web-based learning (e.g. Chang et al., 2012; Ottenberg et al., 2016), but there are few similar studies about blogs. When learners wrote longer posts, they could reflect more deeply than in very short posts. Based on the Gibbs model, one explanation for this might be that longer written texts might contain different stages of the Gibbs model that precede the most reflective stage of reflection. This explanation is also confirmed by Moon (1999) that very short writings can only remain descriptive in journal writing. It has also been found that successful situations may increase the desire to learn (Boud, 2001) and provide positive feelings and self-confidence to discuss experiences, but failures possibly reduce confidence in discussing problems (Ellis et al., 2014). Due to this, successful experiences could be analysed more reflectively in the blog than failures. Therefore, from this study it also seems that failures might be more difficult to analyse and posts about failures might remain at the descriptive stage of reflection. Nevertheless, it is also necessary to share unsuccessful experiences (Ferguson et al., 2016) and express negative feelings, otherwise these could distort and hinder understanding (Boud, 2001). Reflection might help beginner teachers to see failures as learning opportunities and making mistakes may not be a negative experience if there is a possibility to reflect with peers (Marshall et al., 2021). Apparently, the learners also posted about failures in the blog. However, as sharing a negative experience, learners may be afraid of the attitude of others (Boud, 2001). Further, analysing failure also requires learners to scrutinise their own behaviour (Ellis et al., 2014), maybe in a collective blog this is not so easy for learners. The existence of multicollinearity between the characteristics in the regression model was checked, which excludes

strong relationships between the above-mentioned characteristics (Field, 2009), meaning that posts about successes were not longer.

Higher learner evaluations of the suitability of blogging and attitudes to electronic communication may also affect learner reflection in the blog, something that has previously been studied rather little. In particular, learner reflection in the blog might have been affected by how appropriate it was for the learner to interact and learn with others in the blog. Similarly, when teachers perceived that the reflection method supported their work, they were motivated to use it (Allas et al., 2020). Sharing with others may not be suitable for everyone (Duarte, 2015) and some learners only feel comfortable in written reflection (Lee, 2005). Therefore, if public communication and sharing, and written reflection is suitable for the learner, it could also encourage more in-depth reflection in the blog. This conclusion is similar to what Petko et al. (2017) noted that because of the suitability of blogging some learners may avoid blogging, while others may use the blog for reflection, sharing and collaboration. On the other hand, according to the findings of the current study, more positive attitudes to electronic communication might predict less reflective writing in the blog. It could be that if learners feel free and comfortable in electronic communication, they might use more informal and social speech in their written texts. This kind of post content may support more social interaction than reflection. As this result is quite surprising, the reason why posts by those who prefer electronic communication are less reflective could be further explored. It should also be noted here that according to the regression model, attitudes to electronic communication are not related to evaluations of the suitability of blogging or activeness of blogging.

Student teachers wrote more reflective written texts in this study than induction year teachers. This result may be due to a difference in responsibilities because induction year teachers as ordinary teachers in a school had more responsibilities than student teachers. Therefore, induction year teachers may not have enough time to reflect and consequently they wrote less reflective blog posts compared to student teachers. Other researchers have also revealed that reflective blogging is time consuming (Ciampa & Gallagher, 2015; Morris et al., 2019). Nevertheless, Poom-Valickis and Mathews (2013) have added that induction year teachers had time to reflect, but they need peers and a mentor to support the development of reflection due to poor reflection skills. In the present study, a collective blog that included peers and tutors was used, but the task of the tutors and peers was not to directly guide and support reflection. Therefore, lack of time or poor reflection skills have to be considered when promoting reflection in induction year teachers on the blog.

The changes in learner evaluations of reflection were analysed only with the characteristics of learner blogging activeness, and significant correlations were not found. Hence, the findings based on changes in learner evaluations of reflection and reflection in blog posts are different. The reasons for the different results may be related to the differences between the methods using evaluations from questionnaires and the content of the blog posts (see more in subchapter *6.2 Methodological implications*).

5.2 Characteristics of blog group and group blogging that related to reflection

In the context of the first and third research question, the regression model included six characteristics of blog group and group blogging that predicted learner reflection based on the Gibbs model. These were average number of words in total posts, percentage of posts about problems, average number of comments per new posts, familiarity of participants, existence of tasks and number of participants that posted more than one post. Four characteristics had positive effects and two characteristics had negative effects on learner reflection in the blog.

The three group blogging characteristics that may affect learner reflection are similar to the individual learner blogging characteristics discussed in the previous subchapter. Active communication including longer writing and more comments from peers and fewer posts about failures in the blog seems to promote learner reflection. The finding of the positive effect of blog group activeness on learner reflection confirms the earlier theory that communication and learning together may promote reflection (e.g., Dewey, 1933; Kolb, 1984). Interactions, such as commenting and learning from each other during teaching practice and the induction year might supplement a learner's own ideas with new perspectives, showing how others can perceive a particular situation. A learner could find new meaning in the information obtained from shared thoughts and learn from it. Other studies have also found that learning in the group help seeing the situation from another point of view (Allas et al., 2020; Boud, 2001; Rodgers, 2002; Sarv & Karm, 2013), promotes expressing one's own views (Shoffner, 2008), thinking about one's beliefs (Boud, 2001; Sarv & Karm, 2013) and get advice (Rodgers, 2002) to improve the practice (Allas et al., 2020). Hence, it seems that these mentioned findings may be valid in the context of the blog that longer written texts and commenting could lead learners to respond, write and reflect more deeply on their written texts. Other studies in the context of the blog have similarly found that activity in a blog group promoted reflection in teachers' posts (e.g. Nambiar & Thang, 2016; Stoszkowski & Collins, 2017). Consequently, longer posts and comments by blog group members may be important in promoting learner reflection in the blog. When a blog group wrote more about problems, this might lead to less reflective writing based on the Gibbs model, and this is a novel finding in the blog context. Perhaps the atmosphere of sharing problems and complaining in a blog does not encourage learners to engage in reflection individually. The environment should support learning emotionally, where learners feel safe and reflection is encouraged (Moon, 1999; Sarv & Karm, 2013). The second research question also revealed that when a learner writes more about success situations, the writing might be more reflective. Apparently, when learners see that other blog members write less reflectively about failures, the learner individually might not open up and thoroughly analyse the experience as well. Other researchers have also pointed out that the atmosphere of a collective blog depends on how learners behave because the influence of group behaviour on

individual learning is significant (Biberman-Shalev, 2018). To elaborate, the behaviour of peers in a collective blog could be an example for other learners – if some learners write longer and reflective posts, other blog members may start behaving similarly. Several studies have also highlighted the impact of peer behaviour on other learners in a blog (Spafford & Haarhoff, 2015; Sturgill & Motley, 2014). Therefore, the behaviour of the blog group may be important in supporting learner reflection. The example of peers could affect learner activeness, writing about failure and reflection in the blog. Nevertheless, the effect of group blogging on learner reflection has been studied little and the present study may help to better understand the behaviour of peers and its impact on learner reflection.

In setting up blogs to support reflection, stronger social relationships between learners, smaller groups of bloggers, and tasks in the blog might promote learner reflection. It could be that when learners know each other, there are small groups of learners, and tasks in the blog, it might encourage learning together and deeper analysis in the learners' written texts. Other studies have found similar results to the current study that a small and unfamiliar group of academics reflected little in a blog (Smidt et al., 2018), a small group of learners reflected more than a large group in a blog (Al-Fadda & Al-Yahya, 2010) and tasks in the blog promote reflection in the blog (e.g. Harland & Wondra, 2011; Sturgill & Motley, 2014). Tasks might also support the learning atmosphere in the blog because, as outlined above, the behaviour of peers in the blog can facilitate learner reflection. However, it should be considered that the mandatory use of blogs and the setting of tasks might create an overly formal atmosphere and the mechanical execution of tasks (e.g. Chu et al., 2012; Petko et al., 2017). Hence, the focus should also be on the nature of the tasks so that these do not make the blog too formal and help support learner reflection instead. According to the regression model, activeness in the blog does not come from the familiarity between participants or small group size or tasks in the blog, but all three characteristics may promote reflection in the blog.

No significant relations were found between the characteristics of blog group and group blogging and changes in learner evaluations of reflection. Hence, the results of changes in learner evaluations of reflection and reflection in blog posts are different.

5.3 Characteristics of tutors' blogging that related to reflection

Addressing the first and fourth research question, the regression model showed that six characteristics of tutor blogging predicted learner reflection based on the Gibbs model. Learner reflection in the blog was positively affected by three characteristics: total number of posts, stage of reflection in new posts and percentage of posts with questions. Other characteristics had a negative effect on learner reflection in the blog: percentage of posts communicating with others,

percentage of success – percentage of problems in posts and percentage of posts about own experience.

The findings of this study indicate that the tutor should be an active writer in the blog to promote learner reflection. Consequently, this result is similar to the findings about learners and the blog group. When a tutor is an active communicator, it might be that learners feel they are supported and not alone on the blog. In addition, an active tutor who writes new posts and supportive comments might encourage learners to write more reflective blog posts. Nevertheless, the results based on the questionnaires differ from the findings from the blog posts in this study – more new blog posts by the tutor are negatively related to changes in evaluations of reflection. Obviously, the different results might be due to differences between the content of new posts and comments (evaluations of reflection related to new posts, reflection based on the Gibbs model based on new posts and comments). New posts could be more meaningful and longer, but comments might include mostly supportive answers and reactions to learners. Other researchers have also found that tutors' comments perceived by the learners as professional support (Biberman-Shalev, 2018) and tutors' feedback promoted reflection in learners' posts (Yu & Chiu, 2019). Accordingly, maybe the tutors' new posts should be shorter, but the comments for learners could be longer and more meaningful, which may guide learners to reflect. It could be possible that the learners in the current study did not feel confident about their own reflection skills, while tutors were active in writing new posts. Other studies have also found mixed results on the effect of tutor activeness on learner reflection. Some studies indicated that an active tutor affects learner reflection in online discussions (e.g. Ali et al., 2017; Sheridan & Kelly, 2010), others that tutor activity was not related to learner reflection (e.g. Harland & Wondra, 2011). However, tutor activeness seems to be important in promoting learner reflection in blogs. According to the multicollinearity in the regression model, tutor activeness and the content of tutors' written texts were not related.

The results of the current study indicated that the collective posts of tutors, and written texts about success and own experiences negatively affected learner reflection. It is quite a surprising result that the collective posts of tutors, where the tutor communicated with the learners, had a negative impact on learner reflection, but blogging activeness by the tutor might promote learner reflection. The nature of both characteristics were related to communication with learners, but tutor activeness on the blog is only based on the number of blog posts; the level of the collectiveness of tutors' posts is related to the content of written texts. The one reason why a tutor writing collectively might not promote reflection could be that tutors were free to choose the topics they would write and had no direct obligation to support learner reflection in the blog. Therefore, tutors' posts including communication with learners might have been rather social, or invited learners to write in the blog and these did not support reflection. Other researchers have also found in a similar vein that tutor comments without any guidance can promote a more social atmosphere than reflection (Jones & Ryan, 2014).

In addition, tutors writing about success and their own experiences could reduce learner reflectivity in posts. These results confirm the findings of other studies that a tutor should not share their own knowledge alone (Dalgarno et al., 2015), but instead encourage learners to share experiences (Biberman-Shalev, 2018; Chen et al., 2009; Szabo & Schwartz, 2011) in order to support reflection. Learners may not find tutors' written texts about their own experiences or success relatable, and therefore it seems that these may not support reflection. The impact of learner and group writing about problems and the success of reflection were different from the finding on tutors blogging about success. Tutor behaviour, as an example for the learners, could be important and when a tutor does not analyse failures, learners might also not analyse failures thoroughly.

On the other hand, when the tutor wrote reflectively and asked questions, it could promote learner reflection in the blog. Other studies have similarly found that demonstrated reflection in online discussions (e.g. Jones & Ryan, 2014; Szabo & Schwartz, 2011) and tutors' questions in the blog (e.g. Biberman-Shalev, 2018; Dalgarno et al., 2015) promoted reflection among learners. Tutors presenting an example of how to reflect may allow learners to understand how to be more reflective in their writing in the blog and may give learners the confidence to reflect. Guidance questions from the tutor might enable learners to move from a descriptive stage of reflection to a more in-depth analysis in their written texts.

Generally, several characteristics related to the learner, the blog group and the tutor affected learner reflection. According to the findings of this study, the conclusions and implications are presented below.

6. CONCLUSIONS AND IMPLICATIONS

The following chapter presents the conclusions, including methodological and practical implications, limitations and suggestions for future research. In the present study, questionnaires and blog posts were used to assess learner reflection, and they yielded different results. Several novel results were found because the effect of different characteristics on learner reflection in the blog has been little studied. The present study found how different groups of characteristics affect learner reflection. This approach differs from previous studies because the effect of different groups of characteristics on reflection has not been studied previously.

6.1 Practical implications

Blogs may be helpful tools to encourage written reflection in teacher education. Below are some practical implications to consider when applying a blog to support learner written reflection in teacher education.

- Learners should be prepared to reflect in the blog. Firstly, learners may need guidance on reflection, especially how to reflect in an electronic environment, so that their writing is more meaningful and reflective. For example, the tutor could direct use reflection models to support written reflection in an online environment. Secondly, learners could be thoroughly informed of the benefits of blogging in order to support their written reflection. Learners would actually benefit from more advice on the importance of interaction and collaborative learning for reflection. If learners acknowledge the importance of collaborative learning and the benefits of using blogs, this could reduce some learners' doubts and increase their confidence in the value of using collective blogs.
- It is important to set up a blog group in such a way that learners feel comfortable in the learning community. If possible, the number of learners ought to be rather small in a blog and they could be familiar with each other. Learners with strong relationships might have a greater sense of freedom and confidence in a small group and this may promote their reflection.
- Attention could be paid to the strategies to activate learners to promote reflection during the blogging. Activeness was one of the strongest aspects among the blogging characteristics of learners and blog groups that might promote learner reflection. Probably the more active members were those for whom written reflection suits them. As written reflection is important, participants should be encouraged and directed to actively write and discuss in the blog. For example, tasks and questions by the tutor might help the learner to be active and meaningful and might support analysing their experiences more

deeply. Furthermore, active communication in the blog may support social interaction between participants, and this might also promote learner written reflection.

- It may be important to take notice of analysing own successful and failure experiences by learners and blog groups, because of its different effects on learner reflection. More posts about learners' own successes promoted reflection in blogs. Blog group writing about problems resulted in less reflective writing by learners. Thus, it may be useful to guide learners to analyse unsuccessful situations in-depth as well. For example, tutor could ask questions, give tasks or direct to use some reflection models that guide learners to be more reflective in their writing. Tasks in the blog are important and could guide learners to actively write and analyse in more detail both successes and failures. Still, it should be ensured that the tasks do not make the use of the blog too formal, which would not actually promote reflection. Furthermore, Gibbs' reflection model was used to analyse the reflection in the blog posts because it was taught to learners in their teacher education course. It may be worthwhile to direct learners to reflect in the blog using the Gibbs model. Gibbs' reflection model as an instructional resource would help improve the understanding of the stages of reflection, while also helping learners to be more reflective in their written texts.
- Blogging activeness and content of writings by the tutor were important factors that might promote learner reflection. In addition, the behaviour of the tutor (and peers) as an example in the blog is essential. The tutor should write reflectively and analyse problems deeply as a demonstration for learners of how to reflect, instead of writing too much about their own experiences. It is necessary to create an atmosphere that encourages learning and reflection because modelling for others and learning together could make a collective blog an effective tool to support reflection.

6.2 Methodological implications

Reflection can be assessed in several ways, and two different measurement methods were used in this study. Two reflection questionnaires were applied to assess learner evaluations of reflection, and the content analysis of blog posts was used to assess reflection in texts written by learners based on the Gibbs model. When measuring reflection on the basis of self-evaluations or blog posts, the specifics of these methods have to be taken into account. Here are some methodological implications of this study.

- The Reflection Questionnaire and Reflection in Learning Scale may be suitable for use in the field of education to assess reflection in the Estonian context. The Reflection Questionnaire included reflection and critical reflection subscales, but the results showed that a single item is suitable for assessing

both reflection and critical reflection. In applying the Reflection in Learning Scale, it should be considered that although it assesses reflection in learning, the main scale includes four subscales measuring different aspects of reflection. The current study showed that the adjusted Reflection in Learning Scale with ten items may be the most appropriate for assessing reflection in the Estonian context, instead of the original scale with 14 items.

- The three tested reflection subscales can be used successfully together, as they assess different aspects. Assessing several aspects of reflection might give a broader picture of how learners use reflection. As a result, teacher educators may be more aware of how to support reflection when they can identify which aspects of reflection are perceived by the learners as being weaker and require development.
- Changes in learner evaluations of reflection were assessed in this study. The findings led to a discussion of the problems related to the self-evaluation of their own skills by learners. For example, subjectivity and the ceiling effect are the properties of using self-report questionnaires. Learners might undervalue or overvalue their own reflection skills, and Likert scales cannot show an increase in evaluation if the highest evaluation has already been given at the beginning. Therefore, these kinds of self-evaluations may not show a real change in reflection. It should be taken into account in future studies that the use of questionnaires may not adequately measure changes in learner evaluations of reflection.
- In addition to the questionnaires, learner blog posts were analysed using content analysis to determine reflection in the blog posts based on the Gibbs model. The data from the content analysis showed the use of written reflection in the blog posts. The content analysis of blog posts may provide a more objective and accurate picture of reflection in this study than assessing the development of reflection using the questionnaires.
- It should be considered that the content of the blog posts assesses only written reflection skills, while the reflection subscales do not distinguish the type of reflection that is being evaluated – verbal, mental or written reflection. However, the whole process of using a blog and analysing blog posts is time consuming. Content analysis of blog posts depends on the researcher, but the reliability of the content analysis process can be increased with various measures. For example, a coding manual was created and used in the current study. In future research, it will be possible to analyse the content of blog posts with this coding manual (an example coding manual is presented in Appendix 1).

6.3 Limitations and suggestions for future research

The writing of this doctoral thesis has taken place over a long period of time, giving the author an opportunity to critically analyse the choices made in the course of the research. The analysis of blog posts was based on Gibbs' reflection model because learners were familiar with this model from their teacher education courses. Retrospectively, it may be worthwhile to consider using models that have been widely used for assessing the stages of written reflection (e.g. Mezirow's levels of reflection). The Gibbs model of reflection is primarily designed to support the process of learner reflection that learners go through to analyse their experiences in more depth. Furthermore, the average stage of learner reflection was calculated based on Gibbs' model, which is not the correct method of analysis. As the model begins with descriptive stages and becomes more analytical and reflective, this allows these stages to be treated on an ordinal scale. Therefore, instead of the mean, it would be more appropriate to calculate the median or percentages by assessing reflection based on the Gibbs model. Overall, the author participated in all stages of this study and the choices and findings have contributed a lot to the development of the author as a researcher.

The limitations of this dissertation and suggestions for further research are as follows:

- The data were collected in the 2010/2011 and 2012/13 academic years, when the learners had completed their teaching practice and induction year. ICT tools and technical solutions may have changed and the learners' attitudes towards the use of ICT tools in the learning process may also have changed over time (probably in a more positive direction). New possibilities have been added to support written reflection. Nevertheless, the results from the current study might still help to understand better how to support learner written reflection in online environments.
- However, as learners were taught reflection during teacher education courses, the participants of this study were not taught how to reflect when using blogs. The tutors were able to choose how they would support the learners in the blog. This kind of approach may not be the most effective way to support reflection in the blog. Obviously, using a blog to support reflection would be more effective if learners were guided more consciously on how to reflect.
- The two methods used in this study assessed reflection at different points in time, so these results cannot be compared. The questionnaires assessed learner evaluations of reflection before and after the teaching practice and induction year. Learners used the blog during their teaching practice and induction year, where content analysis of blog posts showed the learner reflection based in this period. If it is necessary to compare the reflection skills measured by several methods, they should be measured equally over time. It would be

useful to compare these results in order to draw more accurate conclusions about the assessment of reflection and the effect of blogging on learners' reflection.

- Not all items of the Reflection Questionnaire and Reflection in Learning Scale were used in the current study. Therefore, it was not possible to fully compare these adapted scales with the original scales. Nevertheless, the results showed that these adapted scales might be suitable for application in the Estonian context.
- When measuring self-reported evaluations with questionnaires, several features have to be taken into account, such as the ceiling effect, the subjectivity of evaluations etc. These properties may have influenced the results of the current study. However, reflection was also assessed using the content analysis of blog posts, which might show more objectively the actual reflection during the teaching practice and induction year.
- Student teachers and induction year teachers from the two main Estonian universities that provide teacher education were included in the sample of the dissertation. There are also smaller institutions in Estonia that offer teacher training, and these were excluded from this study. Accordingly, the results of the current dissertation cannot be generalised for teacher education across all of Estonia.
- The period of using the blog may have been too short to measure the change in learner evaluations of reflection. Likewise, as reflection is a complex phenomenon and learners were not directly instructed to reflect in the blogs, the reflection skills may not change during the teaching practice and induction year.
- Using a blog primarily supports written reflection. However, written reflection may not be suitable for all learners, and this may affect the use of a blog and the evaluations of reflection in this study. At the same time, it is important to offer the opportunity for written reflection because the written expression of one's own thoughts may be more thoughtful and thorough than verbal or mental reflection.

The following are suggestions for future research:

- The changed situation in the world since the spring of 2020 related to the Covid-19 disease has placed further focus on the various ICT opportunities to support learning, including reflection. The present dissertation showed that a blog is one tool that could support learner reflection in teacher education. Therefore, it is recommended that blogs be used to explore and support reflection. The data for this dissertation were collected several years ago. As the use of blogs in the learning process is still popular, it would be interesting to examine whether the results of the current dissertation are still valid today.

- When implementing and researching blogs to support reflection, several characteristics related to learners, blog groups, tutors and their blogging have to be considered. Although many different characteristics were investigated in this study, in the future the effect of the personal characteristics of tutors on learner reflection could also be studied. As the background of student teachers and induction year teachers is different, comparing the reflections of these groups in a blog could provide essential information.
- Other electronic communication tools can also be used to support reflection in teacher education. For example, as a journal tool in the Moodle e-learning environment is currently used in teacher education, the content of journals could be analysed according to the coding manual of this study.
- Examining reflection with different assessment methods is recommended in order to obtain a more complete overview of how to measure reflection and promote reflection skills. However, in order to compare reflection skills on the basis of several methods of assessment should also involve assessing them equally over time. In this way it is possible to compare the results, assess and support learner reflection more effectively, and draw more precise conclusions.
- One option to consider would be to replace the teaching practice report or the development portfolio, both of which have to be submitted at the end of course, with a voluntary commitment to write blog posts during the teaching practice and the induction year. In this case, learners could choose the manner and means of reflection that is best suited to them and it could facilitate the use of a blog for reflection.
- A number of novel findings were identified in the present dissertation because the characteristics affecting reflection in the blog context have been studied little. Therefore, this topic should be further explored to confirm and complement the results of this study. In addition, the two reflection questionnaires were adapted and used for the first time in Estonian conditions. Although the adapted scales showed good validity and reliability, these have some differences in terms of items compared to the original scales. Therefore, the suitability of these scales in the Estonian context could be further checked in the future. To sum up, the dissertation provides good input for future studies, and facilitates better support of reflection in teacher education.

APPENDIX

Appendix I: Example of coding manual

Category	Subcategory	Description	Example
Blogging activeness	Number of words	The number of characters with spaces in blog posts	46
	Number of received comments from other learners	Number of comments received on the new post	4
Level of collectivity in tutors' posts	Individual	Presentation of self-centred information with no links to other posts. There is no appeal to others in the title or no wishes to others at the end of post.	<i>I am glad that I can use the blog.</i>
	Perception of others	There is a phrase in the title where it is understood that the participant is writing to others or considers the presence of others. However, the blog post is self-centred with no links to other posts.	<i>Hello everyone!</i> <i>I hope that everything goes well. Everyone.</i>
Communication with others	Communication with others, which may include asking questions to others, answering questions, responding to a statement made in an earlier post.		<i>A question for everyone. Has anyone supervised or done any project during their school time? What should be considered there? Any suggestions?</i>
			<i>I think you have gone through these great subjects especially for yourself.</i>
Supporting learning community	An invitation or turning to others inviting them to discuss any common problems etc. Efforts will be made to create a common environment for learning and sharing experiences.		<i>Why does not anyone write anything here?</i> <i>Now a call to everyone – please let me know how you solved the problem.</i>

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SUMMARY IN ESTONIAN

Refleksiooni soodustamine ja prognoosimine blogis praktika ja kutseaasta jooksul

Õpetajakoolituses otsitakse pidevalt võimalusi õpetajate professionaalse arengu toetamiseks.

Refleksioon on professionaalse arengu oluliseks osaks (e.g. Killeavy & Moloney, 2010; Kõrkkö et al., 2016), sest võimaldab õppida nii iseenda ja kui teiste kogemustest (Mauri et al., 2017). Refleksioon on tähtis ka Eesti õpetajakoolituses, kuna see on õpetaja kutsestandardis kohustuslik kompetents (Kutsestandard..., 2020). Siiski näitavad teaduslikud uuringud, et Eesti õpetajahariduses peaks professionaalse arengu toetamiseks rohkem tähelepanu pöörama refleksioonile (e.g. Poom-Valickis, 2007; Poom-Valickis & Löfström, 2014).

Õpetajahariduses peetakse eriti oluliseks just kirjaliku refleksiooni toetamist (Fund et al., 2002). Lisaks on oluline jälgida, kuidas õppijad õppeprotsessi jooksul reflekteerivad (Chaumba, 2015). Refleksiooni hindamiseks kasutatakse enim kahte meetodit – kirjutiste sisu hindamist (Kori et al., 2014; Sim & Hew, 2010) ja enesehinnangu skaalasad (Sim & Hew, 2010). Mõned uurijad on soovitanud refleksiooni uurimiseks kasutada erinevaid instrumente koos (e.g. Killeavy & Moloney, 2010; Pinya & Rossello, 2016). Näiteks kui kirjutiste sisuanalüüs võimaldab hinnata kirjalikku refleksiooni (Tang, 2013), siis enesehinnangu skaaladega saab hinnata üldisi hinnanguid refleksiooni kasutamisele. Paraku on uurijad täheldanud mitmeid probleeme refleksiooni hindamisel (Dyment & O'Connell, 2010; Kember et al., 1999; Williams et al., 2019).

Tänapäeval rõhutatakse üha enam õppijakeskse õpikäsituse tähtsust, mille üheks osaks on teadmiste loomine koostöös teistega ja läbi interaktsiooni (Postareff & Lindblom-Ylänne, 2008). Sotsiaalse interaktsiooni peetakse oluliseks ka refleksioonioskuste arendamisel (e.g. Dewey, 1933; Kolb, 1984; Vygotski, 1978). Seetõttu on oluline pakkuda õpetajakoolituses võimalusi reflekteerimiseks koos teiste õppijatega. Üheks võimaluseks on kasutada info- ja kommunikatsioonitehnoloogia vahendeid, näiteks blogi, mis vastaks tänapäevastele õppeprotsessi nõudmistele (Biberman-Shalev, 2019; Eutser & Curcio, 2019). Blogide kasutamine võimaldab kirjalikku reflekteerimist (Biberman-Shalev, 2018; Yang & Chang, 2012) läbi sotsiaalse interaktsiooni (Deng & Yuen, 2013; Harland & Wondra, 2011) vabalt valitud ajal ja kohas (Byington, 2011). Vastavalt eesmärgile saab blogis refleksiooni toetada kindlate juhiste ja õpetuste abil (e.g. Wopereis et al., 2010; Xie, Ke, & Sharma, 2008) või kasutada blogi eelkõige õppijate vaheliseks sotsiaalseks interaktsiooniks reflekteerimise soodustamise eesmärgil (Killeavy & Moloney, 2010).

Käesoleva uuringu kavandamisetaapis otsis Tartu Ülikooli õpetajakoolitus lahendusi õppijate refleksiooni paremaks toetamiseks. Õpetajakoolituse kursuse jooksul tutvustati praktikantidele ja kutseaasta õpetajatele erinevaid refleksioonimudeleid, nt Gibbsi mudelit (1988). Vastavalt 2010/2011 ja 2012/2013 õppeaasta

õpetajakoolituse praktika ja kutseaasta korraldusele (Aineõpetajate pedagoogilise praktika..., 2011; Tallinna Ülikooli õpetajakoolituse..., s.a; Õpetajate koolituse raamnõuded, 2010; 2011), on osalejatel vähe võimalusi koos õppimiseks ja reflekteerimiseks. Kollektiivsete blogide kasutamine võiks olla täiendav võimalus kirjaliku refleksiooni toetamiseks läbi interaktsiooni õpetajakoolituse praktika ja kutseaasta ajal.

Mitmed uurimused on näidanud, et blogi kasutamine toetab õppijate refleksiooni (e.g. Boulton & Hramiak, 2012; Stoszkowski & Collins, 2014, 2017), kuid on ka selliseid tulemusi, kus blogi kasutamisel positiivset efekti refleksioonile ei täheldata (e.g. Duarte, 2015; McNeill et al., 2010). Blogide kasutamise efektiivsus refleksiooni toetajana võib tuleneda sellest, kuidas refleksioonis blogis toetatakse ja mõõdetakse. Lisaks, kuidas blogi on organiseeritud ja kes seal osalevad. Seega tuleb arvestada nii õppijate (e.g. Guadagno et al., 2007; Papastavrou et al., 2016), õpetajate/tuutorite (e.g. Byington, 2011; Kuo et al., 2017) kui blogi grupiga (e.g. Chen et al., 2009; Nambiar & Thang, 2016) seotud karakteristikutega, mis võivad online-keskkonnas suhtlemist ja refleksiooni mõjutada. Mitmed uurijad on ka rõhutanud empiiriliste uurimuste vajalikkust, et välja selgitada, millised tegurid mõjutavad õppijate refleksiooni online-keskkonnas (e.g. Chen et al., 2011; Bates et al., 2009; Van Beveren et al., 2018).

Kokkuvõtteks võiks blogi olla üheks sotsiaalse interaktsiooni ja koosõppimise abivahendiks Eesti õpetajakoolituse üliõpilaste ja kutseaasta õpetajate refleksioonioskuste toetamisel. Tulenevalt eelpool väljatoodust oli doktoritöö eesmärk välja selgitada, kuidas blogisid kasutada refleksiooni toetamiseks õpetajakoolituse praktika ja kutseaasta ajal. Täpsemalt, kuidas erinevad osalejate ja nende blogimise karakteristikud on seotud refleksiooniga blogipostitustes Gibbsi mudeli põhjal. Edaspidi kasutatakse praktikantide ja kutseaasta õpetajate asemel terminit "õppijad".

Vastavalt eesmärgile püstitati neli uurimisküsimust:

1. Kuidas osalejate aktiivsuse ja blogi grupi karakteristikud on seotud õppijate refleksiooni hinnangute muutustega põhinedes küsimustikel?
2. Millised õppijate ja nende blogimise karakteristikud prognoosivad kirjalikku refleksiooni blogipostitustes Gibbsi mudeli põhjal?
3. Millised blogi grupi ja grupi blogimise karakteristikud prognoosivad kirjalikku refleksioon blogipostitustes Gibbsi mudeli põhjal?
4. Millised tuutorite blogimise karakteristikud prognoosivad kirjalikku refleksiooni blogipostitustes Gibbsi mudeli põhjal?

Doktoritöö eesmärgi täitmiseks ja uurimisküsimustele vastamiseks koguti andmed küsimustike ja blogipostituste põhjal ning erinevalt organiseeritud kollektiivsetest blogidest. Uurimuse alguses loodi 30 kollektiivset blogi, mille kasutamise võimalusi tutvustati praktika ja kutseaasta alguses 448-le Tartu Ülikooli ja Tallinna Ülikooli õpetajakoolituse õppijale. Blogi kasutamine oli vabatahtlik

ning juurdepääs blogile ainult blogi liikmetel. Igas blogis osales ka vähemalt üks tuutor, kelleks oli uurimisgrupi liige või ka ülikoolipoolne juhendaja või mentor. Kokku osales uurimuses 29 tuutorit. Blogid olid erinevalt organiseeritud. Iga blogi puhul oli erinev osalejate ja postitajate arv, blogimise perioodi pikkus, õppijate vaheliste sotsiaalsete suhete tugevus ning erinev ülesannete arv. Neid näitajaid nimetati uurimuses blogi grupi karakteristikuteks.

Õppijate blogipostitusi oli praktika ja kutseaasta jooksul kokku 1858 ja tuutorite blogipostitusi 547. Postituste põhjal leiti kvantitatiivse sisuanalüüsiga igale õppijale ja tuutorile erinevad blogimise näitajad, mida nimetati õppijate- ja tuutorite blogimise karakteristikuteks. Nendeks olid blogipostituste arv ja pikkus, kõrgeim refleksioonietapp postituses, mis põhines Gibbsi refleksioonimudelil (1988) ning see, kas postituse sisu osutas õnnestumistele või probleemidele. Lisaks määrati tuutorite blogipostitustest nende käitumisviisi blogis ja kollektiivsuse tase kirjutistes. Õppijate blogimise karakteristikute põhjal, arvatati blogi grupi blogimise karakteristikud lähtuvalt sellest, millisesse blogisse õppijad kuulusid. Nii praktika või kutseaasta alguses kui lõpus täitsid osalejad küsimustikud, milles paluti õppijatel hinnata oma refleksioonioskusi, suhtlemishoiakuid ning blogi kasutamise kogemust. Lisaks küsiti ka vastajate taustandmeid. Küsimustikest saadud andmed nimetati õppijate karakteristikuteks.

Esimesele uurimisküsimusele vastamiseks viidi eelnevalt läbi kinnitav faktoranalüüs ning leiti sisereliaabluse näitajad kahe refleksiooniküsimustiku valiidsuse ja reliaabluse hindamiseks Eesti oludes. Saadud faktormudelid kinnitasid varasemalt leitud faktorstruktuure (Kember et al., 2000; Sobral, 2001) ja alaskaalad näitasid head sisemist kooskõla. Tulemused on uudsed, sest varem pole Eestis nende küsimustike valiidsust ja reliaablust kontrollitud. Edasi arvatati eelja järelküsimustiku andmete põhjal õppijate refleksiooni hinnangute muutused. Samuti arvatati iga õppija ja tuutori blogimise koondnäitajad ning leiti blogi grupi karakteristikud selgitamaks, kuidas õppijate refleksiooni hinnangute muutus on seotud blogi grupi karakteristikute ning õppijate ja tuutorite blogimise karakteristikutega. Tulemused näitasid, et tuutorite uute postituste arv on negatiivselt seotud õppijate refleksiooni ja kriitilise refleksiooni hinnangute muutustega. Seega, kui tuutor oli blogis aktiivne kirjutaja, siis õppijad hindasid oma refleksiooni kasutamist madalamalt. Sellist tulemust võib põhjendada nii, et kui tuutor kirjutas aktiivselt uusi sisukaid postitusi, võisid õppijad tunda end temaga võrreldes oma refleksioonioskuste hindamisel ebakindlalt. Seose- ja võrdlusanalüüsides õppijate refleksiooni hinnangute muutuste ja õppijate blogimise karakteristikute või blogi grupi karakteristikute vahel statistiliselt olulisi seoseid ei leitud.

Teisele uurimisküsimusele vastamiseks arvatati iga õppija blogimise koondnäitajad ning refleksioonihinnangute ja suhtlemishoiakute mediaanid. Õppijate ja nende blogimise karakteristikute seoste väljaselgitamiseks õppijate kirjaliku refleksiooniga viidi läbi regressioonanalüüs. Regressioonimudel näitas, et viis õppijate ja nende blogimise karakteristikut ennustasid Gibbsi mudeli põhjal õppija kirjalikku refleksiooni blogipostitustes. Pikemad postitused ja rohkem postitusi õnnestumistest olid kõige olulisemad karakteristikud, mis soodustasid õppijate kirjalikku refleksiooni blogis. Kui õppijad kirjutasid pikemalt, siis nad

võisid reflekteerida sügavamalt sisaldades Gibbsi mudeli erinevaid etappe võrreldes lühikeste postitustega. Õnnestumistest kirjutamine võis anda õppijatele rohkem enesekindlust ja positiivsema tunde põhjalikumaks reflekteerimiseks. Samas oleks oluline ka ebaõnnestumisi analüüsida, kuid seda on võibolla õppijatel blogis raskem teha. Siin oleks oluline õppijaid teadlikumalt küsimuste või refleksiooni mudeli abil reflekteerima suunata, et nad jõuaksid analüüsivamate kirjutisteni. Õppijate kõrgem hinnang blogimise sobivusele ennustas reflekteerivamaid kirjutisi blogis, ent positiivne hoiak elektroonilise suhtlemise suhtes osutas vähem reflekteerivamatele postitustele. Järelikult võis ühelt poolt õppijate reflekteerimist mõjutada see, kui sobiv oli õppijal blogis teistega suhelda, koos õppida ja kirjalikult reflekteerida. Teiselt poolt, kui tuntakse end elektroonilises suhtlemises mugavalt, võivad postitused olla pigem sotsiaalsed kui reflekteerivad. Siin võiks õppijatele põhjalikumalt selgitada blogimise eeliseid kirjaliku refleksiooni toetamisel ja anda juhiseid, kuidas elektroonilises keskkonnas reflekteerivamalt kirjutada. Tulemused näitasid, et õpetajakoolituse praktikandid kirjutasi reflekteerivamaid postitusi kui kutseaasta õpetajad. See võib tuleneda kohustuste erinevustest õpetajarolli täites: kutseaasta õpetajatel võib olla vähem aega, aga ka reflekteerimisoskusi kui praktikal olijatel.

Kolmandale uurimisküsimusele vastuse saamiseks leiti iga blogi kohta blogi grupi karakteristikud ja arutati grupi blogimise koondnäitajad. Blogi grupi ja grupi blogimise karakteristikute mõju väljaselgitamiseks õppijate kirjalikule refleksioonile viidi läbi regressioonanalüüs. Regressioonmudel näitas, et kuus blogi grupi ja grupi blogimise karakteristikut ennustasid Gibbsi mudeli põhjal õppija kirjalikku refleksiooni postitustes. Blogi grupis toimuv aktiivne suhtlus pikemate postitustega, rohkem kaaslaste kommentaare ning vähem postitusi ebaõnnestumistest soodustasid õppijate kirjalikku refleksiooni. Seega aktiivne suhtlemine ja koosõppimine võib toetada õppija reflekteerimist blogis. Samas blogi grupis probleemidest kirjutamine võib viia vähem reflekteerivate kirjutisteni, sest üldine pessimistlik õhkkond blogis ei pruugi julgustada üksikõppijat sügavamalt oma kogemust analüüsima. Siin tuleb arvestada ka kaaslaste mõjudega: blogis osalejad võivad hakata käituma teiste õppijate eeskujul, mis mõjub ka reflekteerimisele. Blogide loomisel võiks arvestada, et õppijate tugevad sotsiaalsed suhted, väiksem kirjutajate arv blogis ja täiendavad ülesanded võivad julgustada koos õppimist ja oma kogemuste sügavat analüüsi. Ülesannete koostamisel tuleks silmas pidada konkreetset sisu ja eesmärki, et blogi ei muutuks liiga formaalseks, vaid soodustaks õppija tõhusamat reflekteerimist.

Neljandale uurimisküsimusele vastuse leidmiseks arutati tuutorite blogimise koondnäitajad. Tuutori blogimise karakteristikute mõju väljaselgitamiseks õppijate kirjalikule refleksioonile blogis viidi läbi regressioonanalüüs. Regressioonmudel näitas, et kuus tuutori blogimise karakteristikut ennustasid õppija kirjalikku refleksiooni Gibbsi mudeli põhjal. Tulemused näitasid, et aktiivselt uusi postitusi ja kommentaare kirjutav tuutor võib soodustada õppijate kirjalikku refleksiooni. Aktiivne tuutor võib panna õppijaid tundma, et nad pole blogis üksi ja julgustada õppijaid kirjutama blogis reflekteerivamaid kirjutisi. See tulemus erineb esimese uurimisküsimuse tulemusest, kus aktiivselt uusi postitusi kirjutav

tuutor oli negatiivselt seotud õppija hinnangute muutustega oma refleksioonile. Seega võiksid tuutori uued postitused olla lühemad, kuid õppijatele mõeldud kommentaarid pikemad ja sisukamad, mis julgustaks ja suunaks õppijat reflekteerima. Kui tuutori postitused sisaldasid õppijaga suhtlemist, või ta kirjeldas põhiliselt oma õnnestumisi ja kogemusi, vähendasid need õppija reflektiivsust blogipostitustes. Seega, kui tuutori postitused on pigem sotsiaalsed ja pole õppija endaga seotud, siis need tegurid ei pruugi soodustada õppija kirjalikku refleksiooni. Samas, kui tuutor ise kirjutas reflekteerivalt ja esitas küsimusi, siis see võis soodustada õppija refleksiooni blogis. Tuutori eeskuju reflekteerimisel ja suunavad küsimused võivad aidata õppijatel efektiivsemalt oma kogemusi analüüsida.

Kokkuvõtteks näitasid tulemused, et erinevad õppijate, blogi grupi ja tuutoritega seotud karakteristikud on seotud õppija kirjaliku refleksiooniga blogis. Osalejate aktiivne suhtlemine ja koosõppimine võib blogist teha efektiivse õpikeskkonna, mis toetab reflekteerimist õpetajakoolituses. Samas tuleb tähelepanu pöörata ka kirjutiste sisule refleksiooni toetamisel. Käesolevas doktoritöös kasutati kahte refleksiooni mõõtmisviisi: õppijate enesekohaseid hinnanguid ja blogi postituste kvantitatiivset sisuanalüüsi. Ent refleksiooni mõõtmisel tuleb arvestada nende kahe mõõtmisviisi eripäraga, sest need meetodid andsid erinevaid tulemusi. Doktoritöö väärtus seisneb uudsetes tulemustes erinevate karakteristikute mõju kohta õppija refleksiooni toetamisel blogikeskkonnas. Töös on antud mitmeid praktilisi ja metodoloogilisi soovitusi blogide kasutamisel õppijate refleksiooni soodustamiseks ja hindamiseks.

Dokoritööl on mõned piirangud, mis vajavad väljatoomist. Käesoleva töö andmed on kogutud aastaid tagasi, kuid IKT vahendid arenevad ajas kiiresti. Doktoritöös mõõdeti refleksiooni kahe andmekogumismeetodiga erinevatel aegadel ning seetõttu ei saa neid tulemusi omavahel võrrelda. Gibbsi refleksioonimudel on loodud toetama õppija reflekteerimisprotsessi. Tagantjärele võiks kaaluda kirjaliku refleksioonietappide hindamiseks mõnda mudelit, mida on laialdaselt just kirjaliku refleksiooni mõõtmisel kasutatud. Lisaks arutati Gibbsi mudeli põhjal õppija keskmine refleksioonietapp postitustes, mis ei ole korrektne analüüsimeetod. Refleksiooni hinnangute muutuste hindamiseks võis ka aeg olla liialt lühike. Lisaks tuleb enesekohaste küsimustikega andmeid kogudes arvestada mitmete eripäradega (nt laeefekt, subjektiivsus), mis võisid mõjutada ka käesoleva töö tulemusi. Edasistes uurimustes võiks võrrelda, mil määral selle doktoritöö aastaid tagasi kogutud andmed kehtivad ka praegusel ajal. Samuti tuleks tähelepanu pöörata tuutori personaalsete karakteristikute mõjule ning võrrelda õpetajakoolituse praktikantide ja kutseaasta õpetajate refleksiooni blogis. Kuna uurimuse käigus töötati välja kodeerimismanuaal blogipostituste analüüsimiseks, siis saaks seda rakendada ka teistes keskkondades, mis oma olemuselt võimaldavad kirjalikku refleksiooniprotsessi. Uurimuses adapteeritud ja kasutatud refleksiooniküsimustikud erinesid mõnede väidete osas originaalküsimustikest. Seetõttu peaks ka tulevikus nende sobivust Eesti oludes mõõtma.

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