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Weblogs in Teacher Education Internships: Promoting Reflection and Self-Efficacy while Reducing Stress?

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Abstract

The study examines the use of weblogs in teacher education internships and its impact on student stress levels, self-efficacy and reflective abilities. N=176 student teachers were randomly assigned to five groups. Four groups used weblogs (a) *with emotion-focused* or *with problem-focused writing assignments* in combination *(b) with* or *without peer feedback* during a 4-week teaching practice on a daily basis. The control group wrote a final reflection paper instead of blogging. Multilevel linear modeling of longitudinal questionnaire data shows that students with problem-focused weblog writing assignments show a stronger development of self-efficacy during the internship than the other groups, especially when combined with peer-feedback on blog postings. Groups do not differ with regard to stress levels and ability for reflection.

1. Introduction

In recent years, research has been investigating the use of weblogs in a wide range of higher education settings (Deng & Yuen, 2009a; Kori, Pedaste, Leijen, & Mäeots, 2014; O'Donnell, 2006; Sim & Hew, 2010). In lectures and seminars, weblogs are typically used to promote a deeper understanding in content knowledge, to foster learning strategies and to enable exchange between learners. In professional education, such as teacher education and medical education, the pioneering projects have aimed for an increase in "reflective practice", especially during internships. In other fields of application such as therapy and counseling, weblogs are used to help people cope with stressful situations, to develop strategies for problem-solving and for emotional venting. Although there are numerous accounts from case studies, experimental evidence – especially in teacher education – is still scarce. In order to study the potentials of blogging in teacher education, some basic distinctions with regard to implementation and outcome variables are necessary.

1.1 Individual journaling vs. social blogging

Weblogs are chronologically structured personal webpages with integrated functions for communication with readers. As digital records, weblogs can be seen as a digital extension of traditional diaries (Boud, 2001; Hiemstra, 2001; Moon, 2006), allowing not only text entries but also pictures, audio- and video-files. Additionally, blogging has social potentials (Deng & Yuen, 2011; Kim, 2008): next to 1) clarifying one's own thoughts by writing blog postings it is now possible to 2) obtain new ideas by reading the weblogs of others, 3) comment on the weblogs of others and 4) receive comments on one's own blog. Furthermore, weblogs can be written either individually or as a group. With technological developments constantly

evolving, weblogs can be implemented in many different ways, from traditional weblog content management systems, which are commonly used for longer blog entries (e.g. Wordpress), to social networking and microblogging sites focusing on shorter and more frequent posts (e.g. Facebook or Twitter). Evidence for the social potential of weblogs is still mixed. Dickey (2004) observed that teacher education students writing weblogs during their internships showed a higher intensity of communication with peers and tutors, which helped to alleviate feelings of isolation in remote placement sites. While finding evidence for self-reflection and reflective dialog in student blog postings, Deng & Yuen (2007; 2009b) come to the conclusion that weblogs were mainly used to express feelings and exchange emotional support during student teachers' internships. Wopereis, Sloep, & Poortman (2010) observed that critical incidents during teacher internships are reflected in student blogs and social support from other students was apparent. In studies using online forums or e-mail, digital technology has been described as a "lifeline" for students in remote internship placements (Kaplan, Rupley, Sparks, & Holcomb, 2007; Mayer, 2002). Other studies were more skeptical with regard to the social potentials of weblogs in teacher education. Killeavy & Moloney (2010) reported that online communities mirrored existing relations between peers and no development of a specific blogging community was apparent. Top, Yukselturk, & Inan (2010) observe that weblogs are more frequently used for information sharing rather than for deep discussion or reflection.

Based on these results, the social potentials can be roughly grouped into two categories: cognitive (i.e. exchanging information and obtaining new ideas) and emotional (i.e. experiencing understanding and encouragement). Although the social potentials of blogging are theoretically evident, research needs to show, how these potentials can be activated in the practical context of teacher education.

1.2 Problem-focused vs. emotion-focused writing assignments

Despite some positive findings, the effectiveness of both journaling and blogging for educational purposes cannot be taken for granted under all circumstances (McGarr & Moody, 2010; O'Connell & Dyment, 2011). As conventional blogging is a voluntary form of digital self-expression and networking – suitable for persons predisposed to writing and to being visible online – the nature of mandatory blogging in formal contexts such as higher education is different (Kerawalla, Minocha, Kirkup, & Conole, 2008, 2009; Sharma, 2010). While some students simply avoid blogging or make only minimal contributions in order to fulfill the course requirements, others blog for personal reflection, to share resources, or to give each other support. Thus, scaffolding through writing assignments, cognitive and metacognitive prompts as well as feedback has been shown to be essential to engage students in written reflection that goes beyond simple descriptive accounts (Bain, Mills, Ballantyne, & Packer, 2002; Chu, Chan, & Tiwari, 2012; Freeman & Brett, 2012; Hübner, Nückles, & Renkl, 2010; Kori et al., 2014; Petko, Egger, & Graber, 2014; Xie, Ke, & Sharma, 2008). However, some studies have also found that prompts and feedback might hinder successful journal writing by disrupting the personal nature of reflection (Beauchamp, 2014; Otienoh, 2010) or by overscripting the writing strategies of more competent learners (Dillenbourg, 2002; Nückles, Hübner, Dümer, & Renkl, 2009). Given the lack of specific studies in teacher education, it is still unclear, what productive writing assignments and collaboration scripts to support blogging experiences for prospective teachers should look like. Possibly, some lessons can be learned from research on therapeutic writing and coping with stress (Pennebaker, 2004; Peterkin & Prettyman, 2009). Coping with stressful situations has been described as either problem-focused, i.e. developing strategies to change the stress-inducing situation, or emotion-focused, i.e. learning to reappraise the situation in order to feel differently (Carver, 2011; Folkman & Lazarus, 1980). Although problem-focused and emotion-focused

approaches to coping are not exclusive, and positive effects have been shown for both approaches, meta-analyses show greater effects for problem-focused coping interventions (Richardson & Rothstein, 2008).

1.3 Increased reflectivity as outcome

Reflective teaching has been one of the key concepts of teacher professional development (Beauchamp, 2014; Collin, Karsenti, & Komis, 2013; Schön, 1983). Thus, fostering reflectivity has been among the main goals of journaling (Boud, 2001; Moon, 2006). Although many studies have sought to use weblogs to raise the level of prospective teachers' understanding of their own teaching practice in internships, results are still mixed. Stiler & Philleo (2003) were among the first to observe an encouraging level of reflection in prospective teacher blogs. Other early studies pointed to the emotional benefits of blogging. After using weblogs in a teacher professional development course, Quek (2009) found encouraging results, both for individual reflection as well as for exchanging resources. Especially the possibility to exchange pictures, video and links was seen as rewarding. In contrast to these rather positive accounts, more recent studies have been more critical. In the study of Hramiak, Boulton, & Irwin (2009), some teacher education students believed that weblogs have a positive impact on their reflection in internships while others reported blogging to be a repetitive and cumbersome activity, which they would rather have avoided. The majority of newer studies seem to agree that blog posts are mainly descriptive and rarely show high levels of reflection (Killeavy & Moloney, 2010; Luik, Voltri, Taimalu, & Kalk, 2011; Top, Yukselturk, & Inan, 2010; Wopereis, Sloep, & Poortman, 2010; Wright, 2010). However, when comparing the depth of reflection in weblogs with end-of-semester reflective papers, blogging students show higher levels of reflection, although deep levels of reflection are still scarce (Harland & Wondra, 2014).

1.4 Reduced stress and increased self-efficacy as outcome

Next to increased reflectivity, positive effects of blogging can be expected with regard to higher self-efficacy and lower stress levels. Positive effects of journaling and – more recently – blogging with regard to stress and self-efficacy have been shown in medical education and therapy (Dunlap, 2006; Fritson, 2008; Petko et al., 2015). This evidence can be attributed to either problem-focused coping activities, such as strategic considerations and practical problem solving, or emotion-focused coping activities, such as cognitive reframing and emotional venting, as detailed above. In teacher education, results with regard to these potentials are still scarce. As many studies report that beginning teachers suffer from high levels of stress in their first teaching placements, this aspect might be of considerable significance (Kyriacou, 2001; Prilleltensky, Neff, & Bessell, 2016; Rieg, Paquette, & Chen, 2007). Stress and self-efficacy are known to have an inverse relationship, and self-efficacy beliefs are seen as one of the prime factor for teacher resilience (Brown, 2012; Shoji et al., 2016; Yost, 2006).

1.5 Goals and Hypotheses

As results from previous studies on the use of weblogs in teacher education are mainly based on case studies and content analyses, the main goal of this study is to provide experimental evidence comparing uses of weblogs to traditional reflection papers. Additionally, as one of the core potentials of blogging is to promote social support among students, this study seeks to compare the effects of individual digital journaling and social blogging. Further, this study examines how different writing assignments influence the effects of the blogging experience. For this purpose, stress-related writing assignments are employed, inspired by Kaluza (2011) and Meichenbaum (2007). In particular, we compare

problem-focused writing assignments with emotion-focused writing assignments. In combination, the study tests four combinations of epistemic and social weblog writing scripts with a non-scripted control group (Weinberger, Ertl, Fischer, & Mandl, 2005). In this experimental field study, we will test the following hypotheses:

- H1: Teacher education students who write daily weblogs during their internship show a greater development of reflective ability, self-efficacy and stress levels during their internship than students writing a final report based on personal daily records.
- H2: Teacher education students who write with problem-focused writing assignments show a greater development of reflective ability, self-efficacy and stress levels during their internship than students who write with emotion-focused writing assignments.
- H3: Teacher education students who receive peer feedback on their blogs show a greater development of reflective ability, self-efficacy and stress levels during their internship than students who write their blogs privately without peer feedback.
- H4: Teacher education students who write problem-focused weblogs with peer feedback show the most positive development of reflective ability, self-efficacy and stress levels during their internship when compared to the control group.

2. Methods

The study seeks to check the hypotheses by conducting a randomized field trial. The study compares four experimental groups of teacher education students working with different assignments for weblog writing, with a control group working without weblogs but with an assignment for a retrospective written report.

2.1 Context

The randomized field trial was conducted at the [anonymized] University of Teacher Education in [anonymizd] in the context of practical placements of prospective kindergarten and primary teachers in local schools. In [anonymized], kindergarten and primary teacher education is organized as a three-year bachelor's program with integrated internships. The internship chosen for this study is the first where student teachers are expected to teach independently over the course of 4 weeks.

2.2 Participants and Design

The sample consists of N = 176 prospective primary and kindergarten teachers in their second year of study. It includes 21% male and 79% female students with a mean age of 24.4 years (SD = 5.7). Students were randomly assigned to one of five groups, i.e. four experimental groups and one control group (table 1). Although all background variables should be controlled by the strict randomization, we tested potential gender and age differences across groups with non-parametric Wilcoxon tests. After applying a Bonferroni correction for multiple comparisons, we found no significant differences between the five groups. Prior to the internship, each group received a three-hour-course on strategies for stress reduction and reflective writing. After that, students in the experimental groups were asked to write daily blog posts describing their daily experiences over the course of a four-

week, full-time internship in schools or preschools. For the students in the experimental groups, writing a weblog accompanying their internship was a first time experience. The experimental groups received different writing assignments, as detailed below.

Table 1: Experimental and control group conditions and sample sizes

	Blogging with problem-focused writing assignments	Blogging with emotion-focused writing assignments	Control group without weblogs but with written
With peer-feedback	n = 35	n = 35	-
Without peer-feedback	n = 35	n = 36	n = 35

Treatment

Following the approaches of Kaluza (2011) and Meichenbaum (2007), students received different writing assignments, which stayed the same for each blog entry over the course of the internship. The writing assignments (i.e. “prompts) appeared in the writing template of each new blog posting. As these prompts could be deleted, student were not strictly obliged to follow these prompts and questions in their writing.

Students in the problem-focused treatment condition were given the task of describing stressful events, sketching possible reasons, and choosing possible strategies to deal with the problem ("Describe the situation that has stressed you as vividly as possible and outline reasons that could have led to the situation. Which aspects of the problem could you have influenced and which not? Which aspects were more signifcant and which were less so? What conditions could you influence in the future run-up to a similar situation? What do I have to do if the situation is acute? Choose a strategy that is right for you and outline the specific steps of this strategy. Make a note of the impact or specific changes that you expect as a result of using this strategy.").

Participants in the emotion-focused treatment condition were prompted to write about their thoughts and feelings in stressful situations. In addition, they were asked to explore different ways of thinking and feeling about the situation and to actively choose the interpretation which offers most relief ("Describe the situation that has stressed you as vividly as possible. How did you feel about this situation, and how did you interpret it? Are there other ways to see the situation? What is the good about this situation and what can I learn from it? What strengths do I have for dealing with this situation? How will I think about it in a year from now? Form a stress-reducing thought for yourself. It should be as short as possible, personal, positive and formulated in the present.").

Bloggers assigned to groups with peer feedback were additionally required to read the weblogs of two fellow students and provide encouraging and helpful comments on a daily basis. Feedbacks were not prompted in any specific way. Students assigned to groups without peer feedback wrote their weblog all by themselves, without an active readership.

Students in the control group were required to fill in general daily forms describing what topics they had worked on with their pupils, along with personal notes. No specific writing assignments with regard to problem-focused or emotion-focused reflections were given. Based on these forms and notes, students in the control group wrote a general report of their experiences after the end of the internship. These reports were comparable in length with the sum of blog entries made by students in the experimental groups. The control group did not receive peer feedback on their writing. As the final report was due only after the end of the internship, peer feedback did not seem to be comparable to the rather process-oriented and intensive peer feedback in the treatment groups.

2.3 Measures

Students were asked to fill out questionnaires at six points in time, starting one week before the internship (t1), after the first week (t2) as well as after the second (t3), third (t4) and fourth and final week of the internship (t5). A delayed post-questionnaire was administered four weeks later (t6). In order to test our hypotheses, we employed the following questionnaire measures:

The *Perceived Stress Scale 10* (PSS t1, t2, t3, t4, t5, t6; Cohen & Williamson, 1988; Lee, 2012) was used to measure stress levels before, during and after the internship. The composite summative scale consists of 10 items with a 5-point Likert scale, ranging from 10 to 50 (Øt1-t6 Cronbach's alpha = .87).

The *Groningen Reflective Ability Scale* (GRAS t1, t3, t5, t6; Aukes, Geertsma, Cohen-Schotanus, Zwierstra, & Slaets, 2007) was used to assess the general level of reflection student teachers felt capable of. The scale consists of 23 items with a 5-point Likert scale (Øt1-t6 Cronbach's alpha = .83). The composite scale is based on sum scores ranging from 23 to 115.

The *General Self-Efficacy Beliefs Short Scale* (ASKU t1, t2, t3, t4, t5, t6; Beierlein, Kemper, Kovaleva, & Rammstedt, 2013) is constructed of 3 items with a 5-point Likert scale (Øt1-t6 Cronbach's alpha = .88). The composite scale is based on mean scores ranging from 1 to 5. This scale is used to measure the degree of student teachers' general subjective ability to influence their situation.

All measures employed here are not specifically tailored to teachers but are rather general, thus allowing for replication in other disciplines. All composite scales are computed as indicated by their original authors. This ensures comparability of descriptive scores across studies.

2.4 Data Analysis

To compare the development of the three dependent variables (PSS, ASKU and GRAS) across the treatment groups and the control group, we report means and standard deviations of measurements across groups and time. In addition, we employ multilevel linear modeling in order to determine the group effects on individual development over time. Multilevel modeling provides an effective approach for longitudinal comparisons across groups while taking individual differences into account. This is accomplished by treating repeated measurements of the dependent variables (level 1) as nested in persons (level 2) and group memberships as independent factorial predictor variables (Fitzmaurice, Laird, & Ware, 2012; Hox, Moerbeek, & Schoot, 2010). The longitudinal multilevel model results in an overall intercept as well as in regression coefficients for the slope effects for time, group and the interaction effect of time*group. As every person shows a different intercept and slope, standard deviations for group-related coefficients are computed. Compared to more commonly used factorial ANOVAs or repeated measures ANOVAs, multilevel modeling has the advantage that it treats multiple repeated measures as a time series and that it accounts for individual patterns and not just group means. Both sample size of persons (level 2) and measurement points (level 1) in this study are sufficient for this approach (Maas & Hox, 2005). For each of the three dependent variables, a multilevel linear model is fitted for all measurement time-points and for the contrasts indicated by the hypotheses (H1: Bloggers vs. Non-Bloggers, H2: Problem-focused prompts vs. Emotion-focused prompts for blogging, H3: Blogging with peer feedback vs. Blogging without peer feedback). As fixed effects we define time, group and time*group and allow the intercept and slope to vary across individuals. All analyses are conducted using R (3.2.2) along with the packages sjmisc (1.8), sjPlot (2.0.1) and nlme (3.1-128).

3. Results

Before testing the hypotheses by means of multilevel modeling, some general results with regard to descriptive comparisons are presented. Summative composite scores of the Perceived Stress Scale (PSS) show that mean stress levels turn out to be relatively low, i.e. well below the theoretical average of 30 points, in all five groups during the four weeks of the internship (table 2). Stress levels are slightly higher before the beginning of the four-week phase.

Table 2: Mean group scores and standard deviations of the Perceived Stress Scale (PSS) comparing experimental and control groups, t1-t6

	PSS t1		PSS t2		PSS t3		PSS t4		PSS t5		PSS t6	
Blogging groups	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)
emotionfocused	23.94	(6.27)	20.28	(6.41)	21.00	(6.71)	20.11	(5.41)	20.06	(7.78)	20.67	(6.88)
problemfocused	25.89	(6.37)	21.97	(6.90)	22.34	(6.50)	22.20	(7.49)	20.43	(7.19)	23.06	(6.37)
emotionfocused/peer	25.14	(7.13)	21.06	(6.48)	22.91	(6.63)	20.91	(6.96)	21.71	(7.04)	21.66	(6.63)
problemfocused/peer	25.43	(6.92)	22.20	(6.80)	21.43	(7.78)	21.14	(6.58)	19.63	(6.59)	21.49	(5.44)
control/ no blogging	26.11	(6.22)	23.40	(7.53)	22.20	(6.94)	21.57	(5.94)	21.57	(7.75)	23.29	(6.44)

Note: PSS composite scale values range from 10 – 50.

With regard to measuring reflective ability (GRAS), mean ratings turn out to be relatively high across all groups, i.e. substantially higher than the theoretical average of 69 points, with low standard deviations, indicating that students are confident with regard to their own ability to reflect on their practice (table 3). At first sight, there seems to be little development in these ratings across the internship.

Table 3: Mean group scores and standard deviations of the Groningen Reflective Ability Scale (GRAS) comparing experimental and control groups, t1-t6

	GRAS t1		GRAS t3		GRAS t5		GRAS t6	
Blogging groups	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Emotion-focused	88.92	(7.90)	89.17	(8.10)	92.22	(9.91)	89.89	(8.99)
Problem-focused	87.74	(5.90)	89.77	(5.77)	88.80	(9.72)	88.23	(7.53)

Emotion-focused/peer	91.43	(7.04)	90.40	(11.05)	90.86	(10.94)	89.14	(11.19)
Problem-focused/peer	88.86	(8.17)	89.71	(6.54)	91.14	(8.43)	88.97	(7.92)
control / no blogging	90.06	(9.01)	89.69	(8.74)	90.03	(8.18)	90.34	(7.32)

Note: GRAS composite scale values range from 23 - 115.

With regard to measuring self-efficacy beliefs (ASKU), students in all groups show positive ratings on average (table 4). However, some differences in the development between groups are apparent. While all experimental groups show some development, this is especially strong in the problem-focused group ($d^{t1\text{-}vs\text{-}t6}$=.56) and in the problem-focused/peer-feedback group ($d^{t1\text{-}vs\text{-}t6}$=.88). In the emotion-focused group ($d^{t1\text{-}vs\text{-}t6}$=.21) and in the emotion-focused/peer-feedback blogging group ($d^{t1\text{-}vs\text{-}t6}$=.17), the development is clearly weaker. In the control group, the change between t1 and t6 is negligible ($d^{t1\text{-}vs\text{-}t6}$=.09)

Table 4: Mean group scores and standard deviations of the General Self Efficacy Scale (ASKU) comparing experimental and control groups, t1-t6

	ASKU t1		ASKU t2		ASKU t3		ASKU t4		ASKU t5		ASKU t6	
Blogging groups	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Emotion-focused	4.06	(0.58)	4.05	(0.55)	4.16	(0.50)	4.06	(0.78)	4.33	(0.68)	4.19	(0.67)
Problem-focused	3.90	(0.45)	4.10	(0.60)	4.12	(0.61)	4.17	(0.64)	4.27	(0.74)	4.17	(0.51)
Emotion-focused/peer	4.01	(0.49)	4.12	(0.55)	4.11	(0.55)	4.14	(0.51)	4.16	(0.55)	4.10	(0.59)
Problem-focused/peer	3.90	(0.45)	4.08	(0.45)	4.17	(0.49)	4.17	(0.54)	4.31	(0.49)	4.31	(0.48)
control / no blogging	4.17	(0.39)	4.04	(0.52)	4.17	(0.51)	4.28	(0.53)	4.21	(0.58)	4.13	(0.51)

Note: ASKU composite scale values range from 1 – 5.

To test hypothesis H1, we built a multilevel model called “Model 1” for each dependent variable. In these models, we compare the results for the pooled experimental groups (n=141) in contrast to the control group (n=35). “Intercept” and “Time” are estimates for the control group’s intercept at time t1 and for the slope respectively (table 5). “Blogger” refers to the experimental groups’ intercept relative to “Intercept”, and “Time*Blogger” refers to the experimental groups’ slope relative to “Time”. In model 1a, the intercept of PSS stress levels is significantly different from zero, but there is no significant change in stress

levels over time for the control group. For the experimental groups neither the intercept nor the slope are different from the control group's intercept and slope. For the Groningen Reflective Ability Scale, the blogging and control group do not differ in intercept and slope, as shown in model 1b. Model 1c lists the results of this model for the General Self-Efficacy Beliefs Short Scale ASKU. All estimates other than "Intercept" – which differs significantly from 0 in the control group – are not statistically significant. Therefore, the pooled experimental groups do not differ from the control group, neither on intercept at t1 nor in change over time (slope). In effect, it does not seem to make a difference with regard to stress levels, reflective abilities or self-efficacy whether students blog or write a final report.

Table 5: Results for Hypothesis H1 with regard to PSS (Model 1a), GRAS (Model 1b) and ASKU (Model 1c): Fixed effects regression coefficients, significance levels and standard errors

	Model 1a			Model 1b			Model 1c		
	PSS		SE	GRAS		SE	ASKU		SE
Intercept	**23.958**	***	1.045	**89.793**	***	1.316	**4.155**	***	0.080
Time	-0.234		0.125	0.052		0.159	0.003		0.011
Blogger	-0.928		1.167	0.013		1.471	-0.125		0.089
Time*Blogger	-0.040		0.140	-0.075		0.178	0.023		0.012

Note: *** $p \leq 001$

To test hypothesis H2, we compare problem-focused Bloggers (n=70) with emotion-focused Bloggers (n=71) in Model 2. "Intercept" and "Time" are estimations for the emotion-focused group's intercept at t1 and for the emotion-focused group's slope. "Problem-focused" is the problem-focused group's intercept relative to "Intercept", and "Time*Problem-focused" is the problem-focused group's slope relative to "Time". Results are listed in Table 6. The PSS results are shown in columns for Model 2a of this table. The slope for the emotion-focused group is negative and significant, meaning that PSS decreased over time. The slope for the problem-focused group does not differ significantly from that of the emotion-focused group, and there is no difference in stress levels before the internship. In terms of the GRAS, neither group differs in intercept and slope, as listed in column Model 2b

of Table 6. For ASKU, the intercept at t1 for the problem-focused group is not significantly different from the emotion-focused group's intercept. As hypothesized, the problem-focused group's self-efficacy increases over time to a larger extend compared to the emotion-focused group's self-efficacy. Although this effect is not especially strong, it is still significant. To summarize these observations, there seems to be no difference between problem-focused and emotion-focused blogging groups with regard to the development of stress and reflective abilities. With regard to self-efficacy, students in problem-focused blogging groups seem to show a more positive development than those in emotion-focused blogging groups.

Table 6: Results for Hypothesis H2 with regard to PSS (Model 2a), GRAS (Model 2b) and ASKU (Model 2c): Fixed effects regression coefficients, significance levels and standard errors

	Model 2a			Model 2b			Model 2c		
	PSS		SE	GRAS		SE	ASKU		SE
Intercept	**22.635**	***	0.731	**90.454**	***	0.878	**4.067**	***	0.057
Time	**-0.256**	**	0.088	-0.045		0.113	0.014		0.008
Problem-focused	0.796		1.037	-1.303		1.246	-0.074		0.081
Time*Problem-focused	-0.035		0.125	0.046		0.160	**0.022**	*	0.011

Note: *** $p \leq .001$ ** $p \leq .01$ * $p \leq .05$

Table 7 shows the results for the comparison of the experimental groups with (n=70) and without (n=71) peer feedback (Hypothesis H3). The stress level decreases significantly for both experimental groups with and without peer feedback, which is no different from the experimental group with peer feedback (Model 3c). The same holds for PSS (Model 3a). For GRAS, the intercept and slope of the experimental group with peer feedback do not significantly differ from the respective estimates for the group without peer feedback (Model 3b). Thus, it does not seem to make a difference with regard to the development of stress levels, reflective abilities and self-efficacy whether students received peer-feedback on their blog-posts or not.

Table 7: Results for Hypothesis H3 with regard to PSS (Model 3a), GRAS (Model 3b) and ASKU (Model 3c): Fixed effects regression coefficients, significance levels and standard errors

	Model 3a			Model 3b			Model 3c		
	PSS		SE	GRAS		SE	ASKU		SE
Intercept	**22.730**	***	0.732	**89.004**	***	0.876	**4.032**	***	0.057
Time	**-0.228**	**	0.088	0.077		0.112	**0.025**	**	0.008
PeerFB	0.606		1.038	1.616		1.244	-0.004		0.081
Time*PeerFB	-0.091		0.125	-0.201		0.159	0.001		0.011

Note: *** p ≤ .001 ** p ≤ .01

When comparing each of the four experimental groups with the control group in the multilevel "Model 4" (related to Hypothesis H4), the effects with regard to the effectiveness of problem-focused blogging on perceived self-efficacy can be confirmed (Table 8). Students in the problem-focused blogging group with peer-feedback show significantly higher increases in ASKU scores than the control group. Students in the problem-focused blogging group without peer feedback also show increased ASKU scores, although this increase is not significant. There are no differences between the slopes of the experimental groups when compared to the control group with regard to stress levels (PSS) and ability to reflect (GRAS). To sum up, students in the group employing problem-focused blogging with peer feedback show the highest gains in self-efficacy, followed by students in the group with problem-focused writing assignments without peer feedback.

Table 8: Results for Hypothesis H4 with regard to PSS (Model 4a), GRAS (Model 4b) and ASKU (Model 4c): Fixed effects regression coefficients, significance levels and standard errors

	Model 4a			Model 4b			Model 4c		
	PSS		SE	GRAS		SE	ASKU		SE
Intercept	**23.958**	***	1.044	**89.793**	***	1.311	**4.155**	***	0.080
Time	-0.234		0.125	0.052		0.158	0.003		0.011
EF	-1.949		1.466	-0.472		1.842	-0.104		0.112
PF	-0.488		1.476	-1.116		1.855	-0.143		0.113
EF w/ PeerFB	-0.679		1.476	1.824		1.855	-0.072		0.113
PF w/ PeerFB	-0.567		1.476	-0.170		1.855	-0.181		0.113
Time*EF	-0.016		0.176	0.109		0.222	0.019		0.015
Time*PF	0.028		0.177	-0.062		0.224	0.025		0.015
Time*(EF w/ PeerFB)	-0.028		0.177	-0.310		0.224	0.003		0.015
Time*(PF w/ PeerFB)	-0.143		0.177	-0.042		0.224	**0.043**	**	0.015

Note: *** p ≤ .001 ** p ≤ .01

To complement the coefficients for fixed effects presented in Tables 5-8, standard deviations (SD) and correlations (Corr) for the random effects for each model are listed in Table 9.

Table 9: Random effects for the twelve Models reported in tables 5-8

		Model 1		Model 2		Model 3		Model 4	
		SD	Corr	SD	Corr	SD	Corr	SD	Corr
a									
	Intercept	5.220	1	5.220	1	5.227	1	5.192	1
	Time	0.263	-0.111	0.296	-0.113	0.293	-0.110	0.257	-0.110
	Residual	4.368		4.305		4.305		4.368	
b									
	Intercept	6.399	1	5.776	1	5.756	1	6.324	1
	Time	0.462	0.068	0.414	0.442	0.402	0.485	0.442	0.111
	Residual	4.832		5.035		5.035		4.832	
c									
	Intercept	0.392	1	0.397	1	0.399	1	0.390	1
	Time	0.033	0.062	0.031	0.104	0.033	0.066	0.031	0.106
	Residual	0.352		0.361		0.361		0.352	

All fitted models were compared with an intercept-only baseline model (df = 3). In Table 10, the Chi2 estimates are listed with corresponding p-values. All models, with the exception of models 2b and 4b, show a better fit than the baseline model. For models 2b and 4b the difference in fit is marginally significant.

Table 10: Baseline comparisons for the twelve models reported in tables 5-8

	Model 1		Model 2		Model 3		Model 4	
	Chi2(5)	p	Chi2(5)	p	Chi2(5)	p	Chi2(11)	p
a	27.566	<.0001	24.159	<.001	24.178	<.001	30.291	0.001
b	10.095	.073	13.486	<.05	14.893	<.05	15.374	.166
c	39.970	<.0001	39.686	<.0001	35.535	<.0001	46.958	<.0001

4. Conclusion and Discussion

While some previous studies have highlighted the potentials of blogging to foster reflection and self-efficacy and to reduce stress in teacher education internships (Deng & Yuen, 2007; Dickey, 2004; Quek, 2009; Stiler & Philleo, 2003), others have noted that the outcomes do not always meet the high expectations (Harland & Wondra, 2014; Hramiak et al., 2009; Killeavy & Moloney, 2010; Wopereis et al., 2010). This study is one of the first to employ experimental methodology in order to test the effects of blogging in teacher education internships. The results of this study support those studies urging caution. Students who wrote weblogs during their internship did not show an overall improvement in stress levels, reflective ability and self-efficacy when compared to the control group, i.e. H1 needs to be rejected and the null-hypothesis is supported. Looking more closely, the study tested the effects of different writing assignments and peer feedback. Here, the results are mixed. Experimental groups which wrote weblogs with either problem-focused or emotion-focused writing assignments, with or without peer feedback do not differ with regard to changes in stress levels during and after their teaching internship. The same holds true with regard to reflective ability. With regard to general self-efficacy, however, writing weblogs with problem-focused writing assignments seemed to be beneficial, especially when peer feedback on individual weblogs is received. Thus, for H3 the null hypothesis seems to be correct, while for H2 and H4 the null hypothesis can be rejected for the effects of problem-focused blogging on self-efficacy. In other words, writing weblog postings with a focus on problem-solving seems to improve the writer's feeling of being in control. Receiving feedback from peers on one's problem-solving approaches seems to add to this feeling. In contrast, writing weblogs with emotion-focused assignments, whether with or without peer feedback, does not improve self-reported self-efficacy. Based on research on the development of teacher self-efficacy, it might be plausible that reflection and feedback on actual problem-solving through weblogs

can support the impression of performance accomplishments, which might be more present in problem-focused weblogs than in emotion-focused weblogs (Klassen, Tze, Betts, & Gordon, 2011; Morris, Usher, & Chen, 2016). In addition, the study highlights the importance of writing assignments when using weblogs in the context of teacher education (Bain et al., 2002; Chu et al., 2012; Hübner et al., 2010; Kori et al., 2014) as well as the social potentials of digital communication during remote internship placements (Kaplan et al., 2007; Mayer, 2002; Xie et al., 2008). For practical teacher education purposes, the study shows that weblogs can be considered as a helpful tool to develop a feeling of self-efficacy in prospective teachers, when weblogs are purposefully employed as tool for individual and joint problem-solving. The writing assignments documented in Chapter 2.2 can be seen as an example of how to prompt students in this direction.

The reasons why effects are limited to self-efficacy and not evident for stress levels and reflective ability are not entirely clear. Although previous studies on stress-related blogging in other fields of application have reported mainly positive findings (for a review, see Petko et al., 2015), these studies have predominantly focused on voluntary blogging in informal settings. In these studies, there might be a self-selection bias of successful bloggers in the findings. In contrast, the study reported in this article has investigated mandatory blogging in a formal educational setting. Results may lead to the conclusion that the informal approach of blogging might not be easily transferrable to more formal settings. In addition, stress levels turn out to be surprisingly low in general – despite other studies reporting high stress levels in teacher education internships (Kyriacou, 2001; Prilleltensky, Neff, & Bessell, 2016; Rieg, Paquette, & Chen, 2007) – and this floor effect might be an additional reason why little impact on stress levels is apparent. Equally interesting is the finding that blogging did not result in significant changes in the subjective feeling of being reflective. The reason for this might be explained by findings from previous studies showing that levels of reflection

in student weblogs are often low (Harland & Wondra, 2014; Killeavy & Moloney, 2010; Luik, Voltri, Taimalu, & Kalk, 2011; Top, Yukselturk, & Inan, 2010; Wopereis, Sloep, & Poortman, 2010; Wright, 2010). As this study did not include an in-depth analysis of student blogs, this reason is speculative. It needs to be noted however, that student ratings on reflective ability are rather high and maybe the scale suffers from a ceiling effect. In addition, reflective ability is usually considered to be a very complex issue that is slow to change, and a four-week internship might be too short for major changes to be expected (Beauchamp, 2014; Collin, Karsenti, & Komis, 2013). The study also has various limitations. It has focused on the effects of treatments on three outcome variables. As these outcome measures were rather general, future studies should try to use more specific variables with regard to teacher-specific aspects of stress, self-efficacy and reflection. In addition, future studies should take process and additional moderating person variables into account. In the present study, these effects were accounted for by randomization alone. All variables were based on self-report measures. In contrast to other studies (Du & Wagner, 2007), we did not take actual performance into account. Moreover, we did not include analyses of weblog postings as a mediating variable. As the intensity of filling out weekly questionnaires was rather high, there might be testing effects that might result in issues of internal validity. However, these potential effects are equal across all groups. Further, clarification is needed on how these results compare with similar approaches using different media such as online forums or e-mail (Kaplan et al., 2007; Rocco, 2010). Keeping these limitations in mind, the results show that blogging in teacher education internships can be a means for fostering self-efficacy when applied in a problem-focused manner and when combined with peer-feedback.

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6. References

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