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The Power of Feedback and Reflection: A Brief Online Scenario-based Learning Activity Designed to Increase Student Teachers' Self-efficacy and Classroom Readiness

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The Power of Feedback and Reflection: A Brief Online Scenario-based Learning Activity Designed to Increase Student Teachers' Self-efficacy and Classroom Readiness

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Abstract

This study aimed to test whether an online scenario-based learning activity increases student teachers' self-efficacy and emotional, motivational, and cognitive classroom readiness before they start their first teaching practicum. Specifically, we explored whether the effectiveness of the intervention depends on the inclusion of expert teacher feedback and the opportunity to reflect on the scenarios. A total of 238 Australian student teachers (64.3% females, mean age = 23.84 years, *SD*= 6.64) participated in the study. The student teachers were randomly assigned to one of three experimental conditions: waiting-control group (scenario-based learning activity), intervention group 1 (scenario-based learning activity, feedback) and intervention group 2 (scenario-based learning, feedback, reflection). The findings from a path model indicated that both intervention types significantly enhanced cognitive classroom readiness. A significant effect on self-efficacy was found for intervention group 2. Overall, our research demonstrates the potential of an easy-to-implement online intervention in enhancing self-efficacy and classroom readiness.

Introduction

Teaching is a highly complex and demanding profession. Teachers have to effectively deal with a diverse student population, face students', parents' and other stakeholders' different and sometimes contrasting needs and expectations, while teaching students in ways aligned with the demands of twenty-first century education characterized by increased accountability and public scrutiny (Flores, 2017). Teacher education programs hold the prime responsibility for adequately supporting aspiring teachers in developing these competencies. Among the numerous learning opportunities provided in these programs, the teaching practicum clearly constitutes the most influential experience in teacher education (e.g., Bullough et al., 2002) and has been labelled as the cornerstone of teaching preparation (Ronfeldt, 2015, p. 204). During the practicum, student teachers can apply acquired pedagogical knowledge in real classrooms within complex school settings, and thus, in a context that most closely resembles the workplace environment they will encounter as a practicing teacher.

Overall, student teachers tend to value the practical teaching experiences offered by the practicum (e.g., Smith & Lev-Ari, 2005), but at the same time, the practicum can be perceived as stressful and overwhelming (e.g., Kokkinos & Stavropoulos, 2016). Moreover, performance in the practicum has been identified as a precursor of later teacher effectiveness and low practicum performance makes student teachers more likely to drop-out from the program and the profession (Goldhaber, Krieg, & Theobald, 2017; NCATE, 2010). In light of this, there is a strong need for teacher education providers to find ways to adequately prepare their students for the challenges of the practicum, and to increase their confidence as teachers and their 'readiness' to teach.
The present study therefore tests an online scenario-based learning activity designed to boost student teachers' self-efficacy and classroom readiness before the practicum.

Comparing a waiting-control group in which student teachers worked on scenario-based learning tasks comprising complex classroom situations with two intervention groups including additional feedback (intervention group 1) and additional feedback and a reflection exercise (intervention group 2), allows us to gain insights into the effectiveness of different components and combinations. All in all, by shedding light on the potential of a brief and easy-to-implement online scenario-based intervention and specifically, the role of feedback and reflection in enhancing self-efficacy and classroom readiness, the present study contributes to the literature and yields information that is useful for teacher education practice.

Self-efficacy and multi-dimensional classroom readiness

Student teachers need numerous skills and profound knowledge in multiple areas, such as content knowledge and pedagogical content knowledge (Kunter, Kleickmann, Klusmann, & Richter, 2013) to succeed in the practicum and later as teachers. However, from a socio-cognitive perspective (Bandura, 1997), it also seems necessary that they, themselves, are convinced that they can be successful as teachers, i.e., endorse sufficiently high levels of teaching *self-efficacy* (e.g., Dellinger, Bobbett, Olivier, & Ellett, 2008). Self-efficacy has, for example, been found to augment positive emotions and counteract negative emotions during the teaching practicum (Hascher & Hagenauer, 2016). Furthermore, meta-analyses have linked self-efficacy to (beginning) teachers' decision to remain in the profession (Chesnut & Burley, 2015) as well as to lower burn-out (e.g., Aloe, Amo, & Shanahan, 2014) and higher teaching performance (e.g., Klassen & Tze, 2014), making self-efficacy a particularly promising target for interventions (see also e.g., Weber, Prilop, & Kleinknecht, 2019).

In addition to self-efficacy, a further relevant factor worth targeting in interventions preceding the practicum is pre-service teachers' perceived current '*classroom readiness*'. Different definitions of and approaches to measure classroom readiness exist in the literature on teachers and teacher education (see e.g., Craven et al., 2014; Darling-Hammond, Haigh, Ell, & Mackisack, 2013; Newton, & Wei, 2013; Larsen, 2017). For the purpose of this study, we relied on a multi-dimensional conceptualization with three tangible dimensions reflecting the core psychological concepts of emotions, motivation, and cognition in the teaching domain: Emotional readiness (positive feelings about teaching), motivational readiness (wanting to teach), and cognitive readiness (having the knowledge and skills required to teach).

First, emotions are ubiquitous aspects of teachers' lives (e.g., Frenzel, 2014) and positive emotions have been found to impact on teachers' performance in the practicum (e.g., Chen, 2019). In a similar vein, the recent research synthesis of Keller and colleagues (Keller, Hoy, Goetz, & Frenzel, 2016) underlines the value of teachers' experienced enthusiasm in promoting adaptive student outcomes, such as achievement and motivation, as well as teacher outcomes, such as well-being. Accordingly, emotional readiness in terms of general positive emotions towards teaching and feeling enthusiastic about teaching covered the affective space of classroom readiness. Second, a student teacher arguably cannot be called 'classroom ready' if he or she does not (yet) want to teach, and fails to see any personal value in being a teacher (see also e.g., Watt & Richardson, 2007, for the overlapping component of 'intrinsic career value'). Therefore, motivational readiness was introduced as a broader drive to start teaching, including the personal importance attached to becoming a teacher. Third, complementing self-efficacy and its more narrowly defined future-oriented focus on specific teaching tasks, student teachers' general impression of their capabilities in the teaching domain represent pivotal prerequisites of their effective teaching and well-being (e.g., Yeung, Craven, & Kaur, 2014). For this reason, cognitive classroom readiness was included as third facet to capture student teachers' perceptions of the extent to which they

possess the knowledge and skills required to be a good teacher—a construct proximal to self-concept (e.g., Shavelson, Hubner, & Stanton, 1976; see also e.g., Paulick, Großschedl, Harms, & Möller, 2016).

How can we effectively foster pre-service teachers' self-efficacy and classroom readiness?

An intervention aiming to prepare student teachers for the practicum and, crucially, boost their self-efficacy and classroom readiness ideally combines a range of elements to achieve the best outcomes (see also Authors, anonymized). As such, interventions should provide *authentic and complex learning experiences* that prompt student teachers to consider different ways of acting and problem solving in everyday teaching situations (e.g., Sheridan & Kelly, 2012). Such approaches, known as scenario-based learning (SBL), case-based learning, or problem-based learning (e.g., Errington, 2011; Smith & Ragan, 2005) rely on principles of situated learning theory (e.g., Lave & Wenger, 1991) and situated cognition (e.g., Brown, Collins, & Duguid, 1989), stating that learning is maximized if it can be embedded in situations that mirror the context in which learners later have to apply their acquired knowledge.

SBL has been found to be effective in promoting students' learning in different fields, such as medical education and training programs for police officers (e.g., McLean, 2016; Werth, 2011). In addition, scarce research in teacher education suggests that scenario-based learning approaches can enhance student teachers' self-efficacy (Goodin, Bartos, Caukin, & Dillard, 2014). SBL could also be effective in increasing student teachers' self-perceived classroom readiness: For instance, such activities allow student teachers to take on the role of the 'actor' and navigate through challenging and meaningful classroom situations, thereby potentially raising their motivation to teach and identification with the profession (motivational classroom readiness). Given that participating in SBL activities has shown to produce learning gains and evoke positive feelings (e.g., McLean, 2016; Sheridan & Kelly, 2012), they should also lead to higher ratings of self-evaluated knowledge and skills in student teachers (cognitive classroom readiness) and more positive teaching-related emotions (emotional classroom readiness).

The power of feedback and reflection

Core aspects of SBL and related authentic learning approaches that could underlie their effectiveness and drive changes in self-efficacy and classroom readiness in populations of student teachers evolve around two components that can be seamlessly integrated within the scenario tasks (e.g., Battista, 2017; Herrington, Oliver, & Reeves, 2003): First, SBL activities inhere principles of good *feedback* practices, arguing that feedback needs to be timely, specific, accessible, and able to 'feed-forward' in that learners should be able to apply what they have learnt (e.g., Gibbs & Simpson, 2004; Hounsell, 2007; Smith, Starratt, McCrink, & Whitford, 2019). Feedback can be highly informative as it points towards gaps between one's current understanding and what is aimed to be understood (Hattie & Timperley, 2007). Considering that 'social persuasion', i.e., evaluative performance-related comments one receives, constitutes one of the sources of self-efficacy highlighted by Bandura (1997; see also e.g., Morris, Usher, & Chen, 2017; Oh, 2011; van Rooij, Fokkens-Bruinsma, & Goedhart, 2019), appropriate feedback should--and has been found to--impact on self-efficacy (e.g., Smith et al., 2019).

Feedback could also conceivably be critical in shaping classroom readiness. Without guiding feedback, student teachers working on an SBL activity might easily feel lost, whereas additional feedback should increase motivation for teaching by helping student teachers to

thoroughly understand how to act professionally in challenging situations. As feedback assists them to make sense of complex classroom situations, it could enhance their self-perceived knowledge and elicit more positive emotions towards teaching. With regard to the providers of feedback, research indicates that both expert and peer feedback can be valuable (e.g., Weber et al., 2018); nevertheless, experts tend to deliver higher quality feedback than peers (Prins, Sluijsmans, & Kirschner, 2006).

Second, positive effects of SBL might, in addition to feedback, heavily depend on the opportunity *reflection*, defined as the 'intellectual and affective activities in that individuals engage to explore their experiences in order to lead to new understandings and appreciations' (Boud, Keogh, & Walker, 1985, p. 19). Reflection figures prominently in theoretical models explaining the quality of individuals' learning processes and how they self-regulate their learning (e.g., Coulson & Harvy, 2013; Zimmerman & Labuhn, 2012) and reflecting on practice has long been emphasized as a central activity in teacher education (e.g., Dewey, 1933; see e.g., Toom, Husu, & Patrikainen, 2015). As compared to solely including feedback, an SBL combining feedback and reflection allows integrating a 'reflection-feedback-cycle', which could be particularly advantageous: If student teachers' reflections on their responses to a complex classroom scenario are followed by feedback explaining the reasoning of experts regarding appropriate reactions to these situations, student teachers (a) gain insights into experts' reasoning and voids in their own current understandings, (b) can build on these experiences when solving and reflecting on the next classroom scenario, and (c) monitor their professional growth (see e.g., Kleinknecht & Gröschner, 2016; Struyk & McCoy, 1993; Tripp & Rich, 2012, in the context of video-based activities for teacher education).

Prior research has demonstrated that intervention studies with feedback and reflection activities can lead to an upsurge in student teachers' self-efficacy (e.g., Weber et al., 2018; Prilop, Weber, & Kleinknecht, 2019). Similarly, such interventions seem well-suited to support classroom readiness, given that the reflection-feedback cycle should foster high quality learning experiences, and linked to that, more positive judgments of one's teaching competencies that are continually developed and refined throughout the activity as well as higher levels of motivation to start 'real' teaching. They could also promote emotional classroom readiness, as the additional reflection component might aid student teachers to become even more immersed in the activity and develop more positive feelings about their future teaching.

In sum, SBL augurs well as a tool for increasing self-efficacy and classroom readiness, even though it should include (expert) feedback and the possibility to reflect on taken actions in order to unfold its full potential. Nonetheless, despite its promise, limited research on SBL exists in the context of teacher education. Furthermore, to the best of the authors' knowledge, no study has yet examined the different elements of SBL, e.g., SBL with feedback vs. SBL with feedback and reflection, calling for a systematic research agenda addressing these issues.

Exploiting the benefits of online interventions

Different options are available to integrate feedback and reflection in SBL activities. However, classical approaches, such as face-to-face coaching (e.g., Kraft, Blazar, & Hogan, 2018) are time-consuming and largely depend on the availability of personal resources, i.e., experienced coaches. Alternatively, SBL with feedback and reflection can be delivered in an online environment, which overcomes time and space constraints (e.g., Gossman, Stewart, Jaspers, & Bruceman, 2007; for online feedback and reflection environments in video-based

research see e.g., Prilop et al., 2019). Online delivery allows for the intervention to be accessed by large numbers of students either in facilities provided by the teacher education institution or on their own devices at their convenience. Additionally, standardized feedback that has been pre-recorded or pre-written can be automatically displayed, eliminating burdens in terms of required personal resources for the teacher education program. The flexible use and potential of online-based SBL activities to be delivered at scale could make them particularly attractive for both teacher education providers and educational researchers across the world, indicating a need to build an evidence base of their potential to effectively support student teachers.

Research goals and hypotheses

Overall, the goal of the present study was to test a brief and easy-to-implement online intervention aimed at increasing student teachers' self-efficacy and self-perceived classroom readiness, and thus, contributing to their practicum preparation. Relying on an intervention design with three conditions—a control group working on scenario-based content without feedback and reflection, and two intervention groups working on scenario-based content with feedback (intervention 1), and feedback and reflection (intervention 2)—we were able to explore the effectiveness of different intervention components. We hypothesize that, participating in one of the two types of intervention–without distinguishing between the type of interventions–should enhance pre-service teachers' self-efficacy (*Hypothesis 1a*), motivational classroom readiness (*Hypothesis 1b*), emotional classroom readiness (*Hypothesis 1c*), and cognitive classroom readiness (*Hypothesis 1d*), as compared to the control group. Considering the two interventions separately, we expect that both intervention 1 (feedback) and intervention 2 (feedback and reflection) should increase self-efficacy (*Hypothesis 2a* for intervention 1 and *Hypothesis 2b* for intervention 2), motivational classroom readiness (*Hypothesis 2c* and *2d,* respectively), emotional classroom readiness (*Hypothesis 2e* and *2f*), and cognitive classroom readiness (*Hypothesis 2g* and *2h*). In addition, it is assumed that intervention 2 should yield significantly stronger effects than intervention 1 for all outcomes (*Hypothesis 3a* for self-efficacy*, Hypothesis 3b* for motivational classroom readiness, *Hypothesis 3c* for emotional classroom readiness, and *Hypothesis 3d* for cognitive classroom readiness).

Method

Development of the intervention and study procedure

The content of the SBL activity was created by drawing on an extensive bank of online situational judgement tests, a vignette-based assessment method originally developed for teacher selection (for more details see e.g., Klassen, Kim, Rushby, & Bardach, 2020). Given that these situational judgment tests center on complex school-based situations, they lend themselves very well to be adapted for SBL. Research outside of education has explored the efficacy of situational judgment test-based training, with Cox and colleagues (Cox, Barron, Davis, & de la Garza, 2017) reporting that developmental situational judgment tests were more effective than traditional lectures for training volunteers at a humanitarian disaster relief organization. Similar encouraging results have been found using scenario-based training (constructed from situational judgment tests) in health fields (e.g., Hsu, Chang, & Hsieh, 2017).

In the current study, each scenario in the scenario in the situational judgment tests had three response options and student teachers were asked to rate the appropriateness of each option, from (1) appropriate to (4) inappropriate, in consideration of what a beginning teacher should do in the circumstances described in the scenario. Each response was scored, and the scores determined the feedback student teachers received (see below). The scoring key for the situational judgment tests had been established though concordance panels with subject matter experts in the field by adopting a hybrid approach (see Bergman, Drasgow,

Donovan, Henning, & Juraska, 2006 for details): Subject matter experts developed the initial scoring key which was then adapted based upon level of expert consensus, item difficulty, item-total correlations, and applicant--i.e., teacher education candidates--scoring patterns. The scoring was based on the scoring system described by Patterson, Ashworth, and Good (2013), and thus, points were allocated based on the extent to which student teachers' responses aligned with the established scoring key. For instance, student teachers were allocated three points if their response was in direct alignment with the scoring key, two points if their answer was one position away, one point if their answer was two positions away, and no points if three positions away. As the situational judgment tests had primarily been used in the UK, Australian expert teachers and teacher educators checked whether the content and wording were also appropriate for the Australian context. Small adaptations were made (e.g., 'pupils' was changed to 'students', which is more common in Australian schools). Six situational judgment test scenarios were used for the current study.

As a next step and for the purpose of transforming the situational judgment tests from an assessment method to an SBL activity with feedback and reflection opportunities for the two intervention groups, the following adaptations were made. After each response within a scenario, student teachers were asked to elaborate on their rationale behind this choice, and therefore, to reflect on why they considered a specific response as appropriate, inappropriate etc. After reflecting, tailored feedback was displayed. The feedback was generated based on expert teachers' explanations and reflections on why this particular response would be appropriate, inappropriate etc. The expert explanations were then tailored to each possible option: For example, if a student teacher selected 'appropriate', but the experts deemed the response as 'inappropriate', the feedback was framed differently than if the student teacher would have also selected 'appropriate'—even though the core message, i.e., the explanation, remained the same.

All student teachers were randomly assigned to one of three conditions. Prior to the activity, all groups were asked to provide socio-demographic information. In order to compare the elements of SBL, the additional feedback component was included for intervention group 1 and 2, while the reflection component was only used for intervention group 2. The control group worked on the scenarios without feedback and reflection. After the activity, the three groups filled out the outcome measures (self-efficacy, classroom readiness). For intervention group 1 and 2, an additional 'manipulation check' question was included after the SBL activity and before the outcome measures asking them to rate the extent to which they had carefully read the expert teacher feedback. A further question was included only for intervention group 2, asking them to rate the extent to which they had done their best to explain the rationale behind their ratings as an indicator of how seriously they had taken the reflection exercise. A feedback report for the control group, including their chosen options in the scenarios and the feedback from expert teachers was provided after they had done the post-test measures (see Figure 1 for a schematic diagram of the elements of the intervention).

[Insert Figure 1 here]

All invited student teachers received a web link to the SBL activity and completed it on their own device at home. Whether presented as a required learning activity (at one university) or not, no grade or compensation was provided. Consent for this study was sought in accordance with institutional human ethics board approval.

Sample

Of the 264 student teachers who gave consent to the use of their data for research purposes, we excluded 10 participants as they skipped the SBL activity and/or had missing values on

all outcome measures. We did not use the data of 16 further participants of one of the two intervention groups who had indicated that they did not carefully read the feedback and/or worked on the reflection exercise ('manipulation check questions') for the main analyses. Therefore, the effects should be interpreted as effects of the intervention given that the participants appropriately completed the critical intervention components (reading feedback and reflecting)[1]. The resulting final sample consisted of 238 student teachers (86 in the control group and 76 in each of the intervention groups). The participating student teachers were on average 23.84 years old (SD = 6.64) and 64.3% identified as females. The majority of the participants were recruited from two university-based teacher education providers in New South Wales (NSW), one city and one regional (150 and 54 student teachers, i.e., 63.0% and 22.7%, respectively). In addition, 34 (14.3%) current scholarship holders from a range of teacher education programs in NSW participated. Table 1 provides descriptive information separately for the three conditions.

[Insert Table 1 here]

Measures

Self-efficacy. We measured self-efficacy with items adapted from Tschannen-Moran and Woolfolk Hoy (2001), as used by Klassen and Durksen (2014) in a study with student teachers. Klassen and Durksen (2014) slightly modified the wording of the three original items after consultation with a group of teacher educators (sample item: 'I am confident that I can manage student behaviour', $\alpha_{\text{Control Group}}$ = .78; $\alpha_{\text{Intervention 1 (feedback)}}$ = .81; and $\alpha_{\text{Intervention 2 (feedback + reflection)}}$ = .71).

Classroom readiness. Items from existing scales (Frenzel et al., 2016; Klassen, Yerdelen, & Durksen, 2013; Schiefele, Streblow, & Retelsdorf, 2013) as well as self-developed items were used to assess student teachers' perceived classroom readiness in three domains (see also Authors, anonymized): emotional domain (two items, sample item: 'I feel enthusiastic when thinking about becoming a teacher', α_{CG}= .71; α_{Int1}= .77; and α_{Int2} = .82), motivational domain (two items, sample item: 'I am motivated to start teaching as soon as possible', α_{CG}= .70; α_{Int1}= .75; and α_{Int2} = .82), cognitive domain (two items, sample item: 'I think I have the knowledge needed to be a good teacher', α_{CG}= .73; α_{Int1}= .64; and α_{Int2} = .68).

Control variables. The following variables were used as covariates: student teachers' age, year of study, gender (0 = female, 1 = male)[2], prior experience working in schools (0 = yes, 1 = no). These variables were included to control for key sociodemographic characteristics of our sample and because prior research has documented effects on our outcomes of interest (e.g., effects of gender and teaching experience on self-efficacy, see e.g., Huang, 2013; Klassen & Chiu, 2010).

Analyses

The analyses were performed with Mplus Version 8.2 (Muthén & Muthén, 2017) using the robust maximum likelihood estimator (MLR) to account for non-normality of our data. We employed full information maximum likelihood estimation (FIML) to handle missing data. In this study, the amount of missing data present at the item level was very low: 0% for all items except for year of study with 3.4% missing values).

[1] We also re-ran the analyses without excluding these participants and report these findings in the Online Supplements.

[2] Participants also had the option to choose 'prefer not to say' or 'something else' when asked to indicate their gender, but none of the participants in the analysed sample did so.

To analyse the effects of the intervention on the outcomes (self-efficacy, three domains of classroom readiness), we set up a series of path models. In *Model 1a* we first tested whether, overall, the intervention was effective by estimating the effects of the intervention using a dummy-coded variable (0 = control group, 1 = intervention group 1 or intervention group 2). As a next step, we included all control variables and re-estimated the model (*Model 1b*). We reported the effects both without (Model 1a) and with control variables (Model 1b) to increase transparency and to provide information on whether and how effects and potentially patterns of significant vs. non-significant findings changed depending on the inclusion of control variables.

To draw more differentiated conclusions regarding the intervention effects, we then ran a model with two dummy-coded variables for the two intervention groups (*Model 2a*). In addition to the main effects of the two intervention groups, which allowed us to gain insights into whether the two interventions--as compared to the control group--were effective, we also tested the difference in these two regression slopes for significance. This made it possible to infer the differences in the effects of the two interventions. Finally, we entered all control variables and re-ran the model, including the test of differences in regression slopes (*Model 2b*).

We report both unstandardized and standardized regression coefficients, and the latter can be interpreted according to Cohen's (1988) guidelines with values above .10 indicating small effects, values above .30 indicating moderate effects, and values above .50 indicating large effects. All significance testing was performed at the .05 level.

Results

Table 1 provides descriptive information (means and standard deviations for all variables used in the analyses), and correlations among all variables separately for the three groups. The main findings are reported below.

[Insert Table 1 here]

Model 1a. First, and without distinguishing between intervention groups, we tested whether being part of one of the intervention groups had an effect on the measured outcomes. Overall, participating in the intervention (vs. in the control condition) led, as expected, to higher levels of self-reported cognitive classroom readiness (*Hypothesis 1d*, β = 0.32, p = .009). We obtained no statistically significant effects for self-efficacy (*Hypothesis 1a*, β = 0.17, p = .099), emotional classroom readiness (*Hypothesis 1b*, β = -0.02, p = .546), and motivational classroom readiness (*Hypothesis 1c*, β = 0.09, p = .202).

Model 1b. After additionally considering the control variables, the results indicated a significant effect for cognitive classroom readiness (β = 0.35, p = .006), and, as in Model 1a without controls, non-significant effects for all other outcomes (self-efficacy: β = 0.18, p = .094, emotional classroom readiness: β = -0.03, p = .571, motivational classroom readiness: β = 0.10, p = .221). The control variable age was significantly associated with motivational classroom readiness (β = 0.12, p = .015), but was not significantly related to the other outcomes (β's ranging between = 0.04 and 0.08, p's ranging between .475 and .122). No statistically significant effects for gender (female = 0, male = 1) were documented (β's ranging between -0.06 to 0.09, p's ranging between .514 and .931). Years of study was found to be significantly related to self-efficacy (β = -0.16, p = .011). None of the other effects of years of study were statistically significant (β's ranging between -0.03 to -0.16, p's ranging between = .629 and .060). Prior experiences teaching in schools (prior experience = 0, no prior experiences = 1) significantly and negatively predicted self-efficacy (β = -0.15, p =

.021). No significant effects occurred for the three classroom readiness domains (β's ranging between -0.22 and -0.09, *p*'s ranging between .097 and .512).

Model 2a. When distinguishing between the two intervention types, a positive effect in terms of increased self-efficacy was found for the intervention group 2 including feedback and reflection (*Hypothesis 2b*, β = 0.28, *p* = .038), whereas intervention 1 including only feedback did not significantly raise pre-service teachers' self-efficacy (*Hypothesis 2b*, β = 0.06, *p* = .336). None of the effects for emotional classroom readiness (intervention group 1, *Hypothesis 2c*, β = -0.11, *p* = .771, intervention group 2, *Hypothesis 2d,* β = 0.08, *p* = .311) and motivational classroom readiness (intervention group 1, *Hypothesis 2e*, β = 0.13, *p* = .218, intervention group 2, *Hypothesis 2f,* β = 0.06, *p* = .218) attained statistical significance. For cognitive classroom readiness, significant effects emerged for both intervention groups (intervention group 1, *Hypothesis 2g*, β = 0.25, *p* = .044, intervention group 2, *Hypothesis 2h*, β = 0.39, *p* = .008). However, testing the regression slopes for statistical significance did not reveal a statistically significant difference between the two groups: b = -0.15, *p* = .082 for self-efficacy (*Hypothesis 3a*), b = -0.13, *p* = .117 for emotional classroom readiness (*Hypothesis 3b*), b = -0.05, *p* = .335 for motivational classroom readiness (*Hypothesis 3c*), b = -0.10, *p* = .180 for cognitive classroom readiness (*Hypothesis 3d*).

Model 2b. The effect of intervention 2 on self-efficacy remained significant after re-estimating the Model 2a including the control variables (β = 0.29, *p* = .035) and the effect of intervention 1 remained non-significant (β = 0.07, *p* = .330). Similarly, all effects for emotional and motivational classroom readiness were non-significant (emotional classroom readiness: β = -0.12, *p* = .771 for intervention group 1 and β = 0.07, *p* = .327 for intervention group 2; motivational classroom readiness: β = 0.09, *p* = .280 for intervention group 1 and β = 0.12, *p* = .237 for intervention group 2). The results furthermore yielded significant effects for cognitive classroom readiness for both intervention 1 (β = 0.27, *p* = .034) and intervention 2 (β = 0.42, *p* = .757). The pattern of results for all control variables was the same as in Model 1b; with some effect sizes solely differing on the second decimal place (see Table 2). As in the model without control variables, none of the regression slopes differed significantly between the two intervention groups (for self-efficacy: b = -0.15, *p* = .0.75; for emotional classroom readiness: b = -0.14, *p* = .115; for motivational classroom readiness, b = -0.02, *p* = .442; for cognitive classroom readiness: b = -0.10, *p* = .175). All standardized and unstandardized effects including standard deviations can be consulted in Table 2.

We additionally report the results of all analyses based on the sample without excluding student teachers who had indicated that they did not carefully read the feedback or reflected on their responses in the Online Supplement. In these analyses, the results for the overall intervention effects remained unchanged and a statistically significant effects for cognitive classroom readiness, but not for the other outcomes was found. However, the effect of intervention 2 on self-efficacy reached statistical significance only in the model including control variables, with a *p*-value slightly above .05 (i.e., .054) in the model without control variables. For intervention 1, we found no statistically significant effect for cognitive classroom readiness (*p* = .100, and .098 in the model without and with covariates). Table A1 in the Online Supplement provides more details and shows all standardized and unstandardized effects including standard deviations from the additional analyses. In the discussion below, we focus on the results from the main analysis.

Discussion

Can a brief online SBL intervention be recommended as a useful tool for teacher education and particularly, the preparation of student teachers for the complexities of the teaching practicum? What can we infer about the role of feedback and reflection in the context of SBL activities? Guided by these questions, the present study tested the effects of an SBL

intervention and their varying components on student teachers' self-efficacy and their emotional, motivational, and cognitive classroom readiness--as important teacher education outcomes on their own and factors that should facilitate the navigation through the often challenging practicum period (e.g., Weber et al., 2019; Schwarzer & Hallum, 2008).

Focusing on overall intervention effects in the main analyses, the results revealed that participating in one of the intervention groups, as compared to the control group, led to a significant enhancement of cognitive classroom readiness, with a standardized medium-sized effect. Hence, taking part in one of the interventions made student teachers more likely to believe that they possessed the knowledge and the skillset needed to succeed as a teacher. Neither self-efficacy, nor motivational or emotional classroom readiness were significantly altered, and the close-to-zero effect for emotional classroom readiness, had, unexpectedly, a negative sign. While non-significant, the results for self-efficacy and motivational classroom readiness still indicated small standardized effects in favor of the interventions (self-efficacy > motivational classroom readiness, see Table 1 for the means).

Considering the two types of interventions separately (i.e., feedback with and without reflection), aids in clearing up the findings and tells a more differentiated story by disentangling the functioning of different intervention components. When contrasting the effects of each intervention with the control group, several noticeable patterns emerged. First, the intervention combining feedback and reflection, but not the feedback-only intervention significantly raised student teachers' self-efficacy (standardized effect of almost medium size for the first intervention). As already pointed out by Bandura (1986), the ability to self-reflect is fundamental to the construct of self-efficacy. Aligned with this, prior studies have confirmed that engagement in reflection forecasts increases in teachers' self-efficacy (e.g., Beverborg, Sleegers, Endedijk, & van Veen, 2015; Gabriele & Joram, 2007). Reflection helps to arrive at more satisfying solutions by facilitating a deeper understanding. As such, sustained levels of reflection can lead to mastery experiences, i.e., the achievement of goals through one's personal actions and an important source of self-efficacy (Beverborg et al., 2015; see also Bandura, 1997; Morris et al., 2017). Accordingly, the provision of feedback may not have been enough and student teachers needed to make sense of and reflect on the 'why' behind their chosen actions within the SBL activity in order to develop higher levels of self-efficacy. Furthermore, by engaging in reflection, student teachers became more active agents of their own learning, which could have also fed into their self-efficacy (e.g., Mizumoto, 2013; Walton, 2014). By solely being exposed to feedback, a more passive learning experience, the other intervention group was deprived of this more active learning opportunity.

On the other hand, both interventions were effective in augmenting cognitive classroom readiness, with medium and almost medium standardized effects for intervention group 1 and 2 in the main analyses, respectively. Thus, the two interventions succeeded in raising student teachers' more general impressions of their competencies as teachers, whereas the intervention incorporating feedback and reflection had an impact on the more specific construct of teaching self-efficacy. It could be that, in order to foster self-beliefs regarding more global competencies, the transmission of expert knowledge via feedback sufficed; however, only more in-depth engagement with the specific and contextualized classroom scenarios through reflections led to an increase in specific self-efficacy beliefs.

Motivational classroom readiness was not significantly affected by participating in one of the two interventions. One reason underlying this finding could possibly be linked to the content of our motivational classroom readiness measure. Motivational classroom readiness was

conceptualized as a desire to start teaching as soon as possible combined with the personal value attached to teaching and being a teacher. We thus suggest that the second aspect represents a rather stable, more 'trait-like' characteristic that is formed very early in student teachers' career (e.g., Watt & Richardson, 2007), most likely even before starting teacher education. Hence, this feature might be hard to change, especially within the limited time frame of the tested online intervention.

Interestingly, for emotional classroom readiness, it was shown that the negative sign of the (non-significant) effect obtained in the analyses combining both interventions was driven by a negative effect for intervention group 1. Albeit non-significant too, this small standardized effect raises questions, also because intervention 2 had a positive non-significant effect on emotional classroom readiness. A potential interpretation relates to the nature of feedback in our study. Consider that the way feedback was provided in our SBL activity did not leave room for negotiations and follow-up questions due to its standardized and automatized nature. Consequently, the mere exposure to externally generated knowledge, without the opportunity for reflections on one's own approaches to solving complex SBL teaching as internally regulated and autonomous explorations, might have sparked frustration (e.g., Reeve, Jang, Carrell, Jeon, & Barch, 2004), and as a spill-over effect, less positive feelings about teaching.

Finally, testing the regression slopes for statistical significance did not reveal a statistically significant difference between the two groups. We can thus conclude that the effects of the interventions on the considered outcomes did not differ significantly. However, the fact that the effect sizes for all outcomes were larger for the intervention group 2 than intervention group 1 let us still cautiously suggest that combining feedback and reflection could be most advantageous. In addition, it should be mentioned that the intervention effects in both analyses, i.e., the analyses for overall intervention effects as well as those for the effect for the two separate intervention types and the tests of differences between intervention types, remained largely unaffected by the inclusion of a set of control variables. Whereas gender did not predict any of the outcomes, small positive effects of age on self-efficacy and motivational classroom readiness were noted. In addition, year of study significantly and negatively predicted self-efficacy and emotional classroom readiness. As student teachers who were more advanced in their program reported lower levels of self-efficacy and less positive teaching-related emotions, interventions like the one tested in this article might be particularly important for student teachers in later semesters. Moreover, those who reported that they had no prior experience working in school felt significantly less self-efficacious, indicating a need to offer student teachers high quality practical learning experiences at schools that could boost their self-efficacy--as well as interventions, such as the herein described SBL intervention, in periods without teaching opportunities.

Limitations and future directions for research

Some limitations of our work need to be acknowledged that could serve to inspire future studies. First, in addition to examining effects immediately after the intervention, it would be illuminating to explore whether these effects persist or wane over time by employing longitudinal designs with several follow-up tests. Relatedly, our work showed that a one-time intervention can be effective; however, by including more than one intervention session and multiple measurement points it would be possible to address the crucial question of how participating in SBL influences development trajectories of self-efficacy and further outcomes. This could be done by incorporating SBL in a teacher education module for the intervention group, whereas the control group completes the same module without additional SBL. Second, we focused on student teachers' self-beliefs as outcomes and thus,

necessarily relied on self-reports. As such, future studies would do well to expand this focus by including other sources of data (e.g., external observers, such as mentor teachers, e.g., Bieri Buschor & Schuler Braunschweig, 2018, or students, e.g., Bardach, Oczlon, Pietschnig, & Lüftenegger, 2019). Third, our control group did not receive the feedback and the reflection exercise, but was still working on the complex classroom scenarios. Hence, a completely 'neutral' control condition without any involvement in SBL components could further refine the insights gained in our study. Fourth, even though the existing literature suggests that reflection and feedback together should yield the most adaptive outcomes and that feedback stimulates reflection (e.g., Hammerness et al., 2005), future research could complement our findings by testing a reflection-only intervention group in addition to the groups introduced in our work. Fifth, the scenarios used in our study relied on a text-based format. Hence, replications of our work using video-based formats of these scenarios, which have been found to be more engaging than text-based ones (Bardach, Rushby, Kim, & Klassen, 2020), and which might therefore offer an even better foundation for the SBL activity lies ahead.

Conclusions

Given that 'practitioners, in any field, encounter many problem situations within their professional lives which are difficult to replicate realistically and bring to life in a lecture format' (Gossman et al., 2007, p. 141), teacher education-tailored online SBL activities consisting of challenging and realistic school-based situations hold immense promise for educational practice and the widespread use in teacher education. Our work has shown that SBL, particularly if it combines reflection and feedback, is effective in increasing student teachers' self-efficacy and cognitive classroom readiness, and points towards the value of SBL activities as an important preparation strategy for the teaching practicum. Furthermore, the current study enriches the limited body of research on SBL activities in teacher education (e.g., Sheridan & Kelley, 2012) and our SBL approach (see also Authors, anonymized) adds to the active research landscape on interventions with student teachers by offering a new and fruitful framework for conducting interventions. Although research on SBL in teacher education is still in its infancy and more empirical studies systematically testing its effects are certainly warranted, it has, we believe, a bright future, and we are excited to witness and contribute to its further development and use in educational practice.

References

Aloe, A. M., Amo, L. C., & Shanahan, M. E. (2014). Classroom management self-efficacy and burnout: A multivariate meta-analysis. *Educational Psychology Review, 26*(1), 101-126.

Authors, anonymized

Bandura, A. (1986). The Explanatory and Predictive Scope of Self-Efficacy Theory. *Journal of Social and Clinical Psychology, 4*(3), 359–373.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W. H. Freeman and Company.

Bardach, L., Oczlon, S., Pietschnig, J., & Lüftenegger, M. (2019). Has achievement goal theory been right? A meta-analysis of the relation between goal structures and personal achievement goals. *Journal of Educational Psychology*. Advance Online Publication. doi:10.1037/edu0000419

Bardach, L., Rushby, J. V., Kim, L. E., & Klassen, R. M. (2020). Using video-based situational judgment tests for teacher selection: A quasi-experiment exploring the relations between test format, subgroup differences, and applicant reactions. *European Journal of Work and Organizational Psychology.* Advance Online Publication. doi: 10.1080/1359432X.2020.1736619

Battista, A. (2017). An activity theory perspective of how scenario-based simulations support learning: A descriptive analysis. *Advances in Simulation, 2*(1), 23.

Bergman, M. E., Drasgow, F., Donovan, M. A., Henning, J. B., & Juraska, S. E. (2006). Scoring situational judgment tests: Once you get the data, your troubles begin. *International Journal of Selection and Assessment, 14*(3), 223-235.

Beverborg, A. O. G., Sleegers, P. J. C., Endedijk, M. D., & Van Veen, K. (2015). Towards Sustaining Levels of Reflective Learning: How Do Transformational Leadership, Task Interdependence, and Self-Efficacy Shape Teacher Learning in Schools? *Societies, 5*(1), 187–219.

Bieri Buschor, C., & Schuler Braunschweig, P. (2018). Predictive validity of a competence-based admission test - Mentors' assessment of student teachers' occupational aptitude. *Assessment & Evaluation in Higher Education*, *43*, 640-651.

Boud, D., Keogh, R., & Walker, D. (Eds.). (1985). *Reflection: Turning experience into learning*. Oxon: Routledge.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*(1), 32-42.

Bullough Jr, R. V., Young, J., Erickson, L., Birrell, J. R., Clark, D. C., Egan, M. W., ... & Smith, G. (2002). Rethinking field experience: Partnership teaching versus single-placement teaching. *Journal of Teacher Education, 53*(1), 68-80.

Chen, J. (2019). Efficacious and Positive Teachers Achieve More: Examining the Relationship Between Teacher Efficacy, Emotions, and Their Practicum Performance. *The Asia-Pacific Education Researcher*, *28*(4), 327-337.

Chesnut, S. R., & Burley, H. (2015). Self-efficacy as a predictor of commitment to the teaching profession: A meta-analysis. *Educational Research Review*, *15*, 1-16

Coulson, D., & Harvey, M. (2013). Scaffolding student reflection for experience-based learning: A framework. *Teaching in Higher Education, 18*(4), 401–413.

Cox, C. B., Barron, L. G., Davis, W., & de la Garza, B. (2017). Using situational judgment tests (SJTs) in training. *Personnel Review, 46,* 36-45.

Craven, G., Beswick, K., Fleming, J., Fletcher, T., Green, M., Jensen, B., . . . Rickards, F. (2014). *Action now: Classroom ready teachers. Teacher Education Ministerial Advisory Group*. Retrieved from https://docs.education.gov.au/system/files/doc/other/action_now_classroom_ready_teachers_ accessible.pdf

Darling-Hammond, L., Newton, S. P., & Wei, R. C. (2013). Developing and assessing beginning teacher effectiveness: The potential of performance assessments. *Educational Assessment, Evaluation and Accountability*, *25*(3), 179-204.

Dellinger, A. B., Bobbett, J. J., Olivier, D. F., & Ellett, C. D. (2008). Measuring teachers' self-efficacy beliefs: Development and use of the TEBS-Self. *Teaching and teacher education, 24*(3), 751-766.

Dewey, J. (1933). *How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process*. Boston: D.C. Heath & Co Publishers.

Errington, E. P. (2011). Mission possible: Using near-world scenarios to prepare graduates for the professions. *International Journal of Teaching and Learning in Higher Education, 23*, 84-91.

Flores, A. M. (2017). Teaching and developing as a teacher in contradictory times. *Teachers and Teaching, 23*, 123-126.

Frenzel, A. C. (2014). Teacher emotions. In R. Pekrun & L. Linnenbrink-Garcia (Eds.), Educational psychology handbook series. International handbook of emotions in education (pp. 494–518). New York, NY: Routledge/Taylor & Francis Group.

Frenzel, A.C., Pekrun, R., Goetz, T., Daniels, L.M., Durksen, T.L., Becker-Kurz, B., & Klassen, R.M. (2016). Measuring teachers' enjoyment, anger, and anxiety: The Teacher Emotions Scales (TES). *Contemporary Educational Psychology*, *46*, 148-163.

Gabriele, A. J., & Joram, E. (2007). Teachers' reflections on their reform-based teaching in mathematics: Implications for the development of teacher self-efficacy. *Action in Teacher Education, 29*(3), 60-74.

Gibbs, G., & Simpson, C. (2004). Does your assessment support your students' learning. *Journal of Teaching and learning in Higher Education, 1*(1), 1-30.

Goldhaber, D., Krieg, J. M., & Theobald, R. (2017). Does the match matter? Exploring whether student teaching experiences affect teacher effectiveness. *American Educational Research Journal, 54*(2), 325-359.

Goodin, T., Bartos, S., Caukin, N., & Dillard, H. (2014). *Teacher Preparation Program Redesign: Problem-Based Learning and Teacher Candidate Self-Efficacy*. Paper presented at the annual meeting of the American Educational Research Association in Philadelphia, USA.

Gossman, P., Stewart, T., Jaspers, M., & Bruceman, C. (2007). Integrating web-delivered problem-based learning scenarios to the curriculum. *Active Learning in Higher Education*, *8,* 139-153.

Haigh, M., Ell, F., & Mackisack, V. (2013). Judging teacher candidates' readiness to teach. *Teaching and Teacher Education, 34*, 1-11.

Hammerness, K. M., Darling-Hammond, L., Bransford, J., Berliner, D. C., Cochran-Smith, M., McDonald, M., et al. (2005). How teachers learn and develop. In L. Darling-Hammond, J. Bransford, P. LePage, K. Hammerness, & H. Duffy (Eds.), *Preparing teachers for a changing world: What teachers should learn and be able to do* (pp. 358–389). San Francisco: Jossey-Bass.

Hascher, T., & Hagenauer, G. (2016). Openness to theory and its importance for pre-service teachers' self-efficacy, emotions, and classroom behaviour in the teaching practicum. *International Journal of Educational Research, 77*, 15-25.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81-112.

Hounsell, D. (2007) Towards more sustainable feedback to students. In D. Boud, and N. Falchikov (Eds.) *Rethinking Assessment in Higher Education. Learning for the longer term* (pp. 101-103). London: Routledge: 101–113.

Herrington, J., Oliver, R., & Reeves, T. C. (2003). Patterns of engagement in authentic online learning environments. *Australian Journal of Educational Technology, 19*, 59–71

Hsu, L., Chang, W., & Hsieh, S. (2017). The effects of scenario-based simulation course training on nurses' communication competence and self-efficacy: A randomized controlled trial. *Journal of Professional Nursing, 31,* 37-49.

Huang, C. (2013). Gender differences in academic self-efficacy: a meta-analysis. *European Journal of Psychology of Education*, *28*(1), 1-35.

Keller, M. M., Hoy, A. W., Goetz, T., & Frenzel, A. C. (2016). Teacher enthusiasm: Reviewing and redefining a complex construct. *Educational Psychology Review, 28*(4), 743-769.

Klassen, R. M., Kim, L. E., Rushby, J., & Bardach, L. (2020). Can we improve how we screen applicants for initial teacher education? *Teaching and Teacher Education.* Advance Online Publication. doi: 10.1016/j.tate.2019.102949

Klassen, R. M., & Durksen, T. L. (2014). Weekly self-efficacy and work stress during the final teaching practicum: A mixed methods study. *Learning and Instruction, 33,* 158-169.

Klassen, R. M., Yerdelen, S., & Durksen, T. L. (2013). Measuring Teacher Engagement: Development of the Engaged Teachers Scale (ETS). *Frontline Learning Research*, *1*, 33-52.

Klassen, R. M., & Tze, V. M. (2014). Teachers' self-efficacy, personality, and teaching effectiveness: A meta-analysis. *Educational Research Review*, *12*, 59-76.

Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology*, *102*(3), 741.

Kleinknecht, M., & Gröschner, A. (2016). Fostering preservice teachers' noticing with structured video feedback: Results of an online- and video-based intervention study. *Teaching and Teacher Education, 59*, 45-56.

Kokkinos, C. M., & Stavropoulos, G. (2016). Burning out during the practicum: The case of teacher trainees. *Educational Psychology, 36*(3), 548-568.

Kraft, M. A., Blazar, D., & Hogan, D. (2018). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research, 88*, 547–588.

Kunter, M., Kleickmann, T., Klusmann, U., & Richter, D. (2013). The development of teachers' professional competence. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss, & M. Neubrand (Eds.), *Cognitive activation in the mathematics classroom and professional competence of teachers* (pp. 63-77). New York, NY: Springer.

Larsen, E. (2017). Developing Professional Learner Identities: A Critical Piece in the Classroom Readiness Puzzle. In *Teacher Education Policy and Practice* (pp. 17-34). Springer, Singapore.

Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press.

McLean, S. F. (2016). Case-based learning and its application in medical and health-care fields: a review of worldwide literature. *Journal of Medical Education and Curricular Development, 3*, 39-49.

Mizumoto, A. (2013). Effects of self-regulated vocabulary learning process on self-efficacy. *Innovation in Language Learning and Teaching, 7*(3), 253-265.

Morris, D. B., Usher, E. L., & Chen, J. A. (2017). Reconceptualizing the sources of teaching self-efficacy: A critical review of emerging literature. *Educational Psychology Review, 29*(4), 795–833.

Muthén, L.K., & Muthén, B.O. (1998-2017*). Mplus User's Guide: Statistical Analysis with Latent Variables* (7th ed.). Los Angeles, CA: Muthén & Muthén.

National Council for Accreditation of Teacher Education (NCATE; 2010). *Transforming teacher education through clinical practice: A national strategy to prepare effective teachers.* Washington, DC: NCATE.

Oh, S. (2011). Preservice teachers' sense of efficacy and its sources. *Psychology, 2*(3), 235–240.

Patterson, F., Ashworth, V., & Good, D. (2013). Situational judgement tests: A guide for applicants to the UK Foundation Programme. *Medical Schools Council*, 1-29.

Paulick, I., Großschedl, J., Harms, U., & Möller, J. (2016). Preservice teachers' professional knowledge and its relation to academic self-concept. *Journal of Teacher Education, 67*(3), 173-182.

Prilop, C. N., Weber, K. E., & Kleinknecht, M. (2019). How digital reflection and feedback environments contribute to pre-service teachers' beliefs during a teaching practicum. *Studies in Educational Evaluation, 62*, 158-170.

Prins, F., Sluijsmans, D., & Kirschner, P. A. (2006). Feedback for general practitioners in training: Quality, styles, and preferences. *Advances in Health Sciences Education, 11*, 289–303.

Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement by increasing teachers' autonomy support. *Motivation and Emotion, 28*(2), 147-169.

Ronfeldt, M. (2015). Field Placement Schools and Instructional Effectiveness. *Journal of Teacher Education*. Advance Online Publication. doi:10.1177/0022487115592463

Schiefele, U., Streblow, L., & Retelsdorf, J. (2013). Dimensions of teacher interest and their relations to occupational well-being and instructional practices. *Journal for Educational Research Online*, *5*(1), 7-37.

Schwarzer, R., & Hallum, S. (2008). Perceived teacher self-efficacy as a predictor of job stress and burnout: Mediation analyses. *Applied Psychology. An International Review, 57*, 152–171.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research, 46*(3), 407-441.

Sheridan, K. M., & Kelly, M. A. (2012). Teaching early childhood education students through interactive scenario-based course design. *Journal of Early Childhood Teacher Education, 33*, 73-84.

Smith, K., & Lev-Ari, L. (2005). The place of the practicum in pre-service teacher education: The voice of the students. *Asia-Pacific Journal of Teacher Education, 33*(3), 289-302.

Smith, P. L., & Ragan, T. J. (2005). *Instructional design* (3rd ed.). New York: John Wiley & Sons.

Struyk, L. R., & McCoy, L. H. (1993). Pre-service teachers' use of videotape for self-evaluation. *The Clearing House, 67*(1), 31-34.

Tripp, T. R., & Rich, P. J. (2012). The influence of video analysis on the process of teacher change. *Teaching and teacher education, 28*(5), 728-739.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17,* 783-805.

Smith, E. C., Starratt, G. K., McCrink, C. L., & Whitford, H. (2019). Teacher Evaluation Feedback and Instructional Practice Self-Efficacy in Secondary School Teachers. *Educational Administration Quarterly*. Advance Online Publication. doi: 10.1177/0013161X19888568

Toom, A., Husu, J., & Patrikainen S. (2015). Student teachers' patterns of reflection in the context of teaching practice. *European Journal of Teacher Education, 38*, 320-340.

Van Rooij, E. C. M., Fokkens-Bruinsma, M., & Goedhart, M. (2019). Preparing Science Undergraduates for a Teaching Career: Sources of Their Teacher Self-Efficacy. *The Teacher Educator, 54*(3), 270–294.

Walton, G. M. (2014). The new science of wise psychological interventions. *Current Directions in Psychological Science*, *23*(1), 73-82.

Watt, H. M., & Richardson, P. W. (2007). Motivational factors influencing teaching as a career choice: Development and validation of the FIT-choice scale. *Journal of Experimental Education, 75*(3), 167–202.

Weber, K. E., Gold, B., Prilop, C. N., & Kleinknecht, M. (2018). Promoting pre-service teachers' professional vision of classroom management during practical school training: Effects of a structured online- and video-based self-reflection and feedback intervention. *Teaching and Teacher Education, 76*, 39–49.

Weber, K. E., Prilop, C. N., & Kleinknecht, M. (2019). Effects of blended and video-based coaching approaches on preservice teachers' self-efficacy and perceived competence support. *Learning, Culture and Social Interaction, 22*, 100318.

Werth, E. P. (2011). Scenario training in police academies: Developing students' higher-level thinking skills. *Police Practice and Research*, *12*(4), 325-340.

Yeung, A. S., Craven, R. G., & Kaur, G. (2014). Teachers' self-concept and valuing of learning: relations with teaching approaches and beliefs about students. *Asia- Pacific Journal of Teacher Education, 42*(3), 305–320.

Zimmerman, B. J., & Labuhn, A. S. (2012). Self-regulation of learning: Process approaches to personal development. In K. R. Harris, S. Graham, T. Urdan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), *APA handbooks in psychology. APA educational psychology handbook, Vol. 1. Theories, constructs, and critical issues* (p. 399–425). American Psychological Association

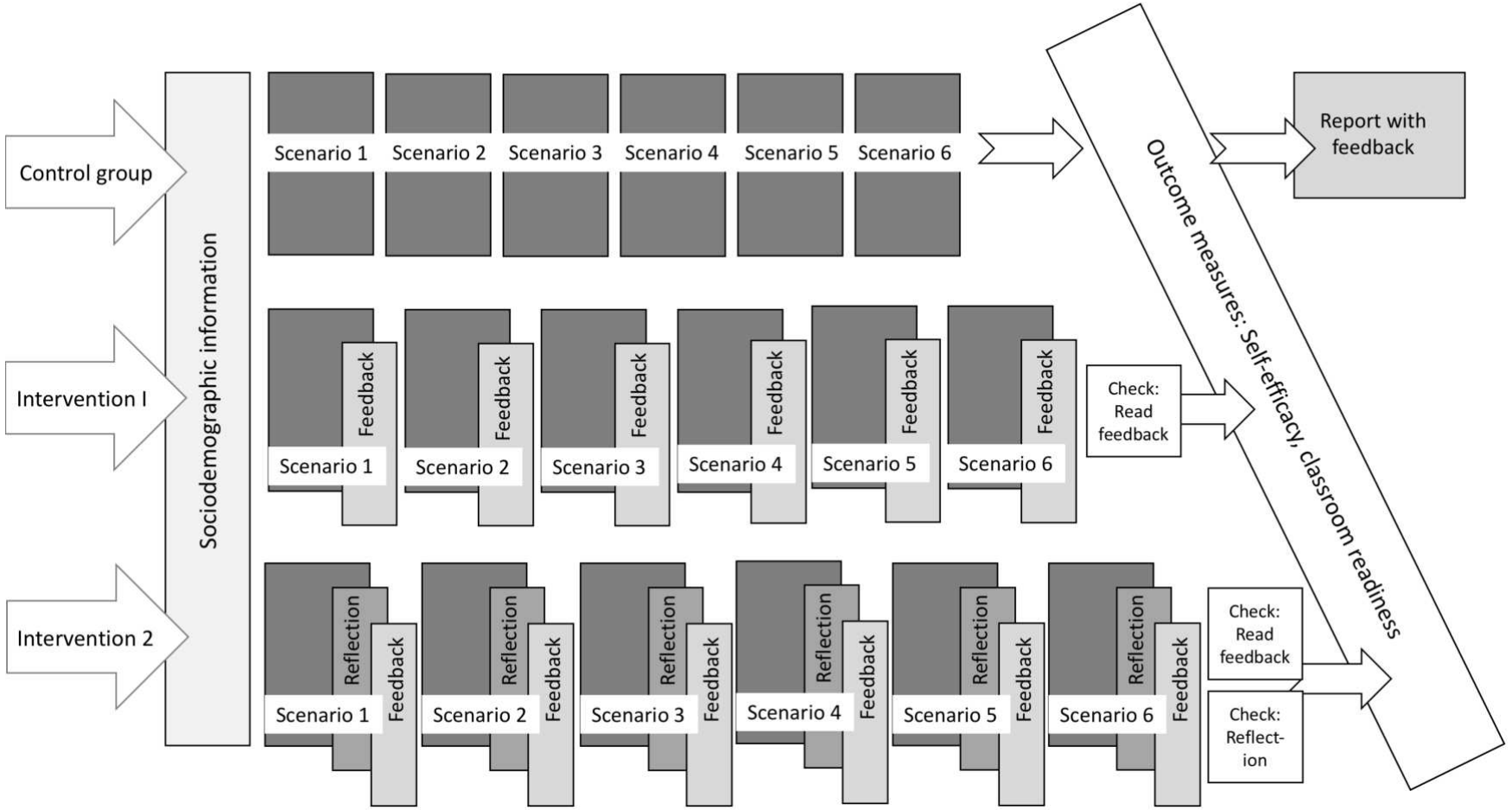

Figure 1. Overview of the experimental design.

Table 1

Descriptive Statistics, and Bivariate Correlations Among All Variables Separately for the Three Groups

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Self-efficacy		**.56/.49/.60**	**.62/.39/.51**	**.61/.67/.71**	.17/**.33**/-.14	08/.02/-.01	06/.20/-.07	-.22/-.09/-.19
2. Emotional CR			**.79/.66/.71**	**.48/.58/.67**	.17/.14/-.17	.07/.07/.08	.12/.06/-.09	-.11/-.10/-.08
3. Motivational CR				**.45/.58/.62**	.22/**.26**/.02	-.03/.02/-.07	.12/.25/-.03	**-.30**/-.02/-.08
4. Cognitive CR					.15/.13/-.08	.07/.04/.04	-.07/.22/.04	-.05/-.01/-.14
5. Age						-.05/.11/.07	**.42/.49/.56**	-.09/-.18/-.05
6. Gender							.03/.03/.09	.03/-.12/.07
7. Years of Study								.24/-.02/.26
8. Prior experience								
M or Percentage [a]	4.66/4.70/4.84	5.31/5.24/5.37	5.08/5.13/5.18	4.68/4.90/4.95	24.16/23.37/23.39	68.6/57.9/65.8	64.0/69.7/63.5	60.5/64.5/60.5
SD	0.68/0.60/0.69	0.75/0.70/0.67	0.79/0.74/0.79	0.75/0.59/0.74	7.47/5.60/6.66	-	-	-

Note. Coefficients and descriptive statistics displayed in the following order: Control group, intervention group 1, intervention group 2; CR = Classroom Readiness; Dummy-coded variables were used for gender (0 = female, 1 = male) and prior experience working in schools (0 = prior experience, 1 = no experience); [a] For continuous variables, we report means and for dummy-coded variables we report the percentage of females (gender), bachelor students (study program), and students with prior experience working in schools (prior experience); Statistically significant correlations at $p < .05$ are boldface.

Table 2

Results of the Regression Models: Effects of the Interventions on Self-efficacy, Emotional Classroom Readiness, Motivational Classroom Readiness, and Cognitive Classroom Readiness

Predictors	Self-efficacy		Emotional CR		Motivational CR		Cognitive CR	
	Est. (SE)	Std. Est.	Est. (SE)	Std. Est.	Est. (SE)	Std. Est.	Est. (SE)	Std. Est.
Model 1a								
Overall Intervention Effect	0.12 (0.09)	0.17	-0.01 (0.10)	-0.02	0.07 (0.11)	0.09	**0.22 (0.10)**	**0.32**
Model 1b								
Overall Intervention Effect	0.12 (0.09)	0.18	-0.02 (0.10)	-0.03	0.08 (0.10)	0.10	**0.25 (0.10)**	**0.35**
Controls: Age	0.01 (0.01)	0.08	0.01 (0.01)	0.04	**0.01(0.01)**	**0.12**	0.01 (0.01)	0.06
Controls: Gender	0.01 (0.01)	0.01	0.06 (0.09)	0.09	-0.05 (0.10)	-0.06	0.03 (0.09)	0.05
Controls: Years of Study	**-0.09 (0.03)**	**-0.16**	-0.07 (0.04)	-0.13	-0.07 (0.04)	-0.11	-0.02 (0.04)	-0.03
Controls: Prior experience	**-0.20 (0.09)**	**-0.30**	-0.12 (0.10)	-0.17	-0.17 (0.11)	-0.22	-0.06 (0.10)	-0.09
Model 2a								
Effect Intervention 1	0.04 (0.10)	0.06	-0.08 (0.11)	-0.11	0.04 (0.12)	0.06	**0.18 (0.10)**	**0.25**
Effect Intervention 2	**0.19 (0.11)**	**0.28**	0.05 (0.11)	0.08	0.10 (0.12)	0.13	**0.27 (0.12)**	**0.39**
Model 2b								
Effect Intervention 1	0.04 (0.10)	0.07	-0.09 (0.12)	-0.12	0.07 (0.12)	0.09	**0.19 (0.11)**	**0.27**
Effect Intervention 2	**0.19 (0.11)**	**0.29**	0.05 (0.11)	0.07	0.09 (0.12)	0.12	**0.30 (0.12)**	**0.42**

Controls: Age	0.01 (0.01)	0.08	0.01 (0.01)	0.04	**0.01 (0.01)**	**0.12**	-0.01 (0.01)	-0.06
Controls: Gender	0.02 (0.09)	0.03	0.07 (0.09)	0.10	-0.05 (0.10)	-0.06	0.04 (0.09)	0.05
Controls: Years of Study	**-0.08 (0.03)**	**-0.16**	-0.07 (0.04)	-0.12	-0.07 (0.04)	-0.11	-0.02 (0.04)	-0.03
Controls: Prior experience	**-0.21 (0.09)**	**-0.31**	-0.13 (0.10)	-0.18	-0.17 (0.10)	-0.22	-0.07(0.10)	-0.09

Note. CR = Classroom readiness; Est. = Unstandardized estimate; Std. Est. = Standardized estimate; SE = Standard Error; Dummy-coded variables were used for gender (0 = female, 1 = male) and prior experience working in schools (0 = prior experience, 1 = no prior experience); One-tailed tests were conducted for the intervention effects, whereas the results for control variables are based on two-tailed tests; Statistically significant results at $p < .05$ are boldface.

Table A1

Results of the Regression Without Excluding Participants Who Did Not Carefully Read Feedback or Did Not Reflect: Effects of the Interventions on Self-efficacy, Emotional Classroom Readiness, Motivational Classroom Readiness, and Cognitive Classroom Readiness

Predictors	Self-efficacy		Emotional CR		Motivational CR		Cognitive CR	
	Est. (SE)	Std. Est.	Est. (SE)	Std. Est.	Est. (SE)	Std. Est.	Est. (SE)	Std. Est.
Model 1a								
Overall Intervention Effect	0.10 (0.09)	0.15	-0.08 (0.10)	-0.10	0.04 (0.11)	0.05	**0.20 (0.10)**	**0.28**
Model 1b								
Overall Intervention Effect	0.11 (0.09)	0.16	-0.09 (0.10)	-0.12	0.05 (0.10)	0.06	**0.21 (0.10)**	**0.30**
Controls: Age	0.01 (0.01)	0.09	0.01 (0.01)	0.05	**0.02(0.01)**	**0.12**	0.01 (0.01)	0.06
Controls: Gender	0.03 (0.09)	0.04	0.07 (0.09)	0.10	-0.03 (0.10)	-0.04	0.04 (0.09)	0.05
Controls: Years of Study	-0.06 (0.03)	-0.12	-0.06 (0.04)	-0.11	-0.05 (0.04)	-0.09	-0.02 (0.04)	-0.04
Controls: Prior experience	-0.16 (0.09)	-0.24	-0.14 (0.10)	-0.19	-0.16 (0.10)	-0.21	-0.08 (0.09)	-0.11
Model 2a								
Effect Intervention 1	0.03 (0.10)	0.04	-0.13 (0.12)	-0.18	0.02 (0.12)	0.03	0.14 (0.11)	0.19
Effect Intervention 2	0.16 (0.10)	0.25	-0.03 (0.11)	-0.04	0.05 (0.12)	0.07	**0.25 (0.11)**	**0.36**
Model 2b								
Effect Intervention 1	0.03 (0.10)	0.04	-0.14 (0.12)	-0.20	0.05 (0.12)	0.06	0.14 (0.11)	0.20
Effect Intervention 2	**0.18 (0.11)**	**0.28**	-0.03 (0.11)	-0.04	0.05 (0.12)	0.07	**0.27 (0.11)**	**0.39**

Controls: Age	0.01 (0.01)	0.09	0.01 (0.01)	0.05	**0.02 (0.01)**	**0.13**	0.01 (0.01)	0.06
Controls: Gender	0.04 (0.08)	0.05	0.08 (0.09)	0.11	-0.03 (0.10)	-0.04	0.04 (0.09)	0.06
Controls: Years of Study	**-0.06 (0.03)**	**-0.12**	-0.06 (0.04)	-0.11	-0.05 (0.04)	-0.09	-0.02 (0.04)	-0.04
Controls: Prior experience	**-**0.16 (0.08)	-0.25	-0.14 (0.10)	-0.19	-0.16 (0.10)	-0.21	-0.08 (0.09)	-0.11

Note. CR = Classroom readiness; Est. = Unstandardized estimate; Std. Est. = Standardized estimate; SE = Standard Error; Dummy-coded variables were used for gender (0 = female, 1 = male) and prior experience working in schools (0 = prior experience, 1 = no prior experience); One-tailed tests were conducted for the intervention effects, whereas the results for control variables are based on two-tailed tests; Statistically significant results at $p < .05$ are boldface.