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RESEARCH ARTICLE



'I can succeed at this': engagement in service learning in schools enhances university students' self-efficacy

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ABSTRACT

Engaging in service learning has been linked to multiple positive outcomes in students, such as an increase in self-efficacy. Effects have been found on both general and domain-specific self-efficacy. Research on service learning has indicated that feedback and gender had an impact on the increase in self-efficacy, though findings are mixed. The present study aimed to determine how service learning experiences at a university can be optimally designed to boost college students' self-efficacy, while examining the effects of feedback and gender on general and teaching self-efficacy. Over 2 years, 267 bachelor's students in psychology ($M_{\text{age}} = 23.08$ years, $SD = 3.61$; 80.5% female) conducted modularized prevention programs in the context of mental health at primary and secondary schools. Students rated their general and teaching self-efficacy before (T1), during (T2), and after (T3) conducting the program. The results indicate a positive effect of engaging in service learning on students' general ($d = 0.30$) and teaching ($d = 0.68$) self-efficacy from T1 to T3 with significant increases only in female students, and after receiving feedback. Engaging in service learning reduced gender-specific differences in self-efficacy. Feedback increased general and teaching self-efficacy. Female students seemed to benefit more than male students.

KEYWORDS



Service learning; self-efficacy; university students; feedback; teaching self-efficacy

Theoretical background

Offering service learning courses is one of many approaches to teaching at universities that provide learning experiences for students (Klopsch and Sliwka 2019). Service learning is defined by three core components, reality, reflection, and reciprocity (Godfrey, Illes, and Berry 2005), and is meant to develop responsible citizenship in its participants (Godfrey 1999) by benefiting all parties involved during the process (Bingle and Hatcher 1995). These parties can be students, lecturers, and the community. Service learning takes place in the community outside the university (Sackett and Alicea 2020). The benefits of service learning in higher education across multiple contexts and across disciplines have been widely described (Chan, Ngai, and Kwan 2019; Kuh 2008; Novak, Markey, and Allen 2007; Rama et al. 2000; Salam et al. 2019; van Goethem et al. 2014; Yorio and Ye 2012; Macías Gomez-Estern et al. 2021).

Self-efficacy

One widely studied aspect of service learning is self-efficacy, which means students' confidence in their ability to deal with and manage new and/or difficult situations (Bandura 1986). Self-efficacy

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can be shaped by enactive mastery experience, vicarious experience, verbal persuasion, and physiological/affective states (Bandura 1997).

Mastery experiences can be defined as successful performances of a specific task (Bandura 1977). These experiences are expected to provide the greatest change in self-efficacy within service learning experiences (Bernadowski, Perry, and Del Greco 2013). Numerous studies found significant improvements in students' self-efficacy after engaging in service learning (Astin et al. 2000; Eyler, Giles, Jr., and Braxton 1997; Gerholz, Liszt, and Klingsieck 2018; Gonsalves et al. 2019; Reeb 2006; Reeb et al. 2010; Reinders and Wittek 2009; Thomas and Landau 2002; Weiler et al. 2013). Positive effects were found in subject-specific self-efficacy (e.g. self-efficacy regarding teaching course content; Gubbels and Vitiello 2018), profession-specific self-efficacy (e.g. social work self-efficacy; Williams, King, and Koob 2002), and community service self-efficacy (e.g. medical students' confidence in making a clinically significant contribution to the community through their service; Simons and Cleary 2006; Stewart 2008). At the same time, in a study on citizenship involvement (Giles and Eyler 1994), a high sense of self-efficacy was an important prerequisite for and hence motivator of course success in college students. Additionally, students with higher rates of self-efficacy reportedly tended more to engage in service learning than students with lower self-efficacy (Reeb 2006) and were more likely to engage in other service learning experiences (Reeb et al. 1998). Yet, it remains unclear what impact service learning has on students' self-efficacy when participation is mandatory.

However, there are also studies that found no difference in students' self-efficacy after engaging in service learning (Meyer, Neumayr, and Rameder 2019) or even decreases in self-efficacy after engaging in service learning (Miller 1997; Stewart and Alrutz 2014).

In service learning experiences, the term *verbal persuasion* itself might be challenging. In the context of service learning and as operationalized by Bernadowski, Perry, and Del Greco (2013), receiving meaningful, supporting, and encouraging feedback by others about one's capabilities to manage probable challenges can be seen as equivalent to Bandura's term verbal persuasion (Bandura 1977). Verbal persuasion should by no means be seen as talking students into participation or convincing them to engage in activities they are not prepared for. In service learning, verbal persuasion is often realized through feedback (as a direct approach) or by ongoing written reflection (as a more indirect approach; see Bernadowski, Perry, and Del Greco 2013). Often, the two approaches are combined such as when the lecturer provides feedback on students' reflections. In a meta-analysis on the outcomes of engaging in service learning in adolescents, a high frequency of reflection served as an important moderator, which was linked to better outcomes of service learning (Goethem et al. 2014). To strengthen the tie between theory and practice, reflective elements were found to be an important aspect (Radović et al. 2020). In general, feedback can lead to changes in self-efficacy (Gonsalves et al. 2019; Higgins, Hartley, and Skelton 2002): For example, Sanders, Van Oss, and McGeary (2016) found that ongoing reflection paired with written instructor feedback after engaging in service learning was associated with improvement in students' self-efficacy. Further, personal self-efficacy was higher in students who received structured feedback compared to those who received unstructured feedback. Tutors can successfully provide feedback, especially when they have taken the seminar earlier in their studies (Kassab et al. 2005; Lockspeiser et al. 2008). Thus, close tutoring helps students have positive experiences and enables them to link seminar content to previous knowledge (Bernadowski, Perry, and Del Greco 2013). Nevertheless, further research on the impact of feedback on students' self-efficacy is recommended (Sanders, Van Oss, and McGeary 2016).

In summary, self-efficacy seems to play a central role in the context of service learning in higher education and can be seen as both an important prerequisite for and an outcome of engaging in service learning. Mastery experience and verbal persuasion help shape students' self-efficacy and have been found to be highly relevant in service learning. However, it remains unclear what aspect of service learning leads to positive changes in self-efficacy and when these changes occur. It is important to examine possible moderators of change in self-efficacy and their impact over the course of the semester. Therefore, this study focused on mastery experiences and verbal

persuasion in enhancing self-efficacy and investigated feedback and gender as possible moderators of change in self-efficacy.

Feedback

Most studies have focused on feedback on the reflection process after engaging in service learning (Conway, Amel, and Gerwien 2009; Eyer 2002; Hatcher, Bringle, and Muthiah 2004; Maddux and Donnett 2015; Sanders, Van Oss, and McGeary 2016), but it remains unclear what role feedback plays during the process. Feedback aims to underline the positive aspects of students' written drafts and reflections, to provide them with further best-practice examples from other students, and to challenge their assumptions in order to further improve (Sanders, Van Oss, and McGeary 2016). Higgins, Hartley, and Skelton (2002) pointed to a lack of research on the impact of feedback on student outcomes: While they were able to show with qualitative interviews that students highly valued feedback from tutors, it remains unclear how feedback impacts students' self-perception and if feedback changes students' outcomes. Shin et al. (2018) assessed the self-reported amount of feedback students received and their 'commitment to purpose' at three assessments. They found that more extensive feedback led to higher commitment to purpose and higher social contribution in students indicating low motivation. However, they did not report differential effects on the outcome variables if feedback occurred or not. Considering Bandura's social cognitive theory, verbal persuasion – feedback in the context of the present study – is an important source of self-efficacy (Bandura 1977). Thus, it is important to investigate the effect of feedback sessions on students' general and domain-specific self-efficacy.

Gender

To a yet unknown extent, gender seems to be a moderator of the link between engaging in service learning (Caspersz and Olaru 2015) and self-efficacy. On the one hand, female students were found to report higher motivation to engage in service learning (Bordelon and Phillips 2006; Darby et al. 2013) and to gain more self-efficacy than male students (Reeb et al. 2010; Stewart 2008). On the other hand, gender was found to be a moderator regarding a decrease in self-efficacy. Male students reported lower self-efficacy ratings than their female counterparts before engaging in service learning and the overall decrease in self-efficacy was greater in male than in female students (Stewart and Alrutz 2014). This contradicts findings from studies in which men reported higher general self-efficacy scores than women (Hinz et al. 2006; Reeb et al. 2010; Stewart 2008). However, Weiler et al. (2013) found no link between gender and students' self-efficacy. Small sample sizes limit the generalizability of these previous findings. In sum, it seems important to consider the effects of gender when analyzing self-efficacy in service learning.

Shortcomings in this research area

Considerable limitations of previous studies on self-efficacy in service learning can be found especially in their methodologies; for instance, self-efficacy was not assessed using a standardized questionnaire but rather with unvalidated questionnaires (e.g. Gubbels and Vitiello 2018; Osborne, Hammerich, and Hensley 1998; Reinders 2010) or single items of validated scales (Reinders 2010); samples were small (Bernadowski, Perry, and Del Greco 2013; Higgins, Hartley, and Skelton 2002; Reinders 2010) or consisted of a heterogeneous group of students from different backgrounds and years of study (Bordelon and Phillips 2006; Darby et al. 2013; Gonsalves et al. 2019; Hébert and Hauf 2015; Higgins, Hartley, and Skelton 2002; Weiler et al. 2013); and most studies relied on a simple pre-post design that did not investigate the course of self-efficacy within a service learning experience. To our knowledge, no study has yet examined the course of both general and domain-specific self-efficacy within mandatory seminars applying the service learning approach. Further, possible

moderators such as gender and the role of feedback have not been studied sufficiently. Thus, in the present study we aimed to determine how service learning can be designed to boost college students' self-efficacy.

Research questions

The following research questions are based on the above-presented empirical findings:

- Is there a change in general and domain-specific self-efficacy over the course of a semester?
- Is providing feedback (verbal persuasion) associated with a change in general and domain-specific self-efficacy?
- Is engaging in service learning experiences (mastery experience) associated with further improvement in general and domain-specific self-efficacy above an increase due to feedback?
- Is gender a moderating variable in changes in general and domain-specific self-efficacy?

Materials and methods

Participants

In 2017 and 2018, a total of 267 psychology students ($M_{\text{age}} = 23.08$ years, $SD = 3.61$, range 20–50 years; 80.5% female, no nonbinary students) at the public university of Koblenz-Landau, Campus Landau, Germany, participated. The students did not have any previous experiential education experience.

Instruments

Self-efficacy

Students completed the General Self-Efficacy Scale (GSES; Schwarzer and Jerusalem 1995), a 10-item self-report questionnaire covering their self-perceived general self-efficacy. Items are rated on a scale of 1 (*not true*) to 4 (*true*), with higher scores indicating higher self-efficacy. Internal consistency in the present study was good with Cronbach's alpha between .83 and .85 at all assessments. To interpret the results, we compared sum scores to German norms (Hinz et al. 2006).

Teaching self-efficacy

To assess teaching self-efficacy, students completed a self-developed self-report questionnaire with 15 items covering aspects of classroom management, such as handling challenging behavior of children (e.g. 'I feel confident facing disruptive behavior shown by a child'), creating a positive learning atmosphere (e.g. 'I feel confident maintaining the children's interest during the program'), and showing confidence in dealing with the class (e.g. 'I feel confident being in charge of the program in front of a class of children'). Items are rated on a scale of 1 (*not true*) to 4 (*true*) to increase comparability with the GSES. Cronbach's alpha was good, ranging from .89 to .91 at all assessments. Correlations between this questionnaire and the GSES were high ($r_{T1} = .53$, $r_{T2} = .55$, $r_{T3} = .60$, all significant at $p < .001$) before (T1), during (T2), and after (T3) conducting the program, thus supporting its convergent validity.

Context of the study

The context of this study was a university seminar based on service learning principles at the bachelor's level within a psychology degree program. As part of their studies in psychology, undergraduate students (hereafter, students) have to take part in a prevention seminar in the context of mental health in their fifth semester. The aim of the seminar is to improve social-emotional competence

in children and adolescents in primary and secondary schools by focusing on the improvement of well-known risk factors (e.g. dysfunctional emotion regulation) and protective factors (e.g. functional emotion regulation, social competence) in the context of mental health. While the focus of the prevention literature has been on outcomes in mental health status of the target population (Beilmann, Pfof, and Schmitt 2014; Johnstone, Kemp, and Chen 2018; O'Connor et al. 2018; Pfeiffer et al. 2019), the aim of this study was to examine the impact of engaging in a service learning-based seminar on university students. Within this mandatory seminar, the service learning context offers students the opportunity to provide a module-based universal prevention program for mental health in schools. In small groups, they are assigned to individual school classes. Students are then supplied with a manual for a modular prevention program, which is based on evidence-based manuals of existing prevention programs for mental health, such as FRIENDS (Barrett and Turner 2001) and Teen Triple P (Sanders and Ralph 2002). In addition, the respective school teacher can choose one or more additional modules, such as social competence, anger management, or dealing with sadness. The students then adapt the manual to the individual demands and write a first draft of their module-based program. This draft includes information about the setting (primary/secondary school, class size, class characteristics), the program's contents, possible difficulties that could occur during the program, and how to manage these challenges. These drafts are then read and evaluated by the lecturer and tutors. The students receive individual feedback on their draft, underlining its strengths and pointing out possible areas of improvement while also providing best-practice examples from the students' peers. Next, students adapt their draft and then run the program in 3–5 sessions with a school class. Thus, the specific program can vary according to teachers' demands. At the end of the semester, students have to hand in a written assignment in which they reflect on their experience, specifically, on the service learning approach, its strengths and weaknesses, and how engaging in service learning might impact their personal development. Neither this assignment nor the students' individual projects are graded. To get the credit points, students are expected to take part in the seminar and hand in the written assignment at the end of the semester.

In order to enable the students, who are mostly without any teaching skills, in an optimal way to teach emotion regulation skills in school classes, any possible support is required (Resch and Schritesser 2021). Besides the theoretical foundations and practical feedback on their drafts provided by the lecturer, students are supported by tutors during the semester. These tutors – students who took part in the same seminar in the past – offer a hands-on tutorial on classroom management and basic teaching techniques. Further, there is the ongoing possibility to receive personal supervision and individual support by the lecturer during the semester if needed.

Procedure

The local ethics committee approved the study. All participants signed informed consent, which included information about data protection and data processing. Students completed questionnaires for both types of self-efficacy at T1, T2, and T3. T2 took place approximately 6 weeks after T1, and T3 took place 4 months after T1. Questionnaires at T3 (after the seminar) were assessed online, regrettably resulting in high attrition rates in both male and female students (T1: $N = 267$, T2: $n = 246$, T3: $n = 114$). To match students' questionnaires over time, students created an individual code that they provided each time they completed a questionnaire.

Data analysis

As a convenience sample was used, sample size was determined by the number of students taking part. All student replies on the questionnaires lay within a reasonable range, and thus, no answers were omitted from analysis. For the analysis of data and to allow for missing values, multivariate multilevel analysis was preferred to analysis of variance with repeated measures for 'it can easily handle

unbalanced data (i.e. a different number of measurement occasions per person)' (Lischetzke, Reis, and Arndt 2015, 593). For testing significance of differences between time points, we computed three models, using T1 (Model 1), T2 (Model 2), or T3 (Model 3) as a reference. The difference between T1 and T2 can be attributed to feedback; the difference between T2 and T3 can be attributed to engaging in service learning. Significant gender differences regarding self-efficacy ratings are known (Hinz et al. 2006); thus, analyses were conducted for males and females by including gender as a dichotomous dummy variable. All analyses were conducted using R (version 3.3.1). For multivariate multilevel models, the nlme package was used and Level 1 residual variance was set to a value close to zero. Mean differences are shown using Cohen's d as a measure of effect size, where $d > 0.2$ is considered a small effect, $d > 0.5$ a moderate effect, and $d > 0.8$ a strong effect.

Results

General self-efficacy over time

Using the multivariate multilevel approach with gender as an additional Level 2 predictor for general self-efficacy, a significant increase in self-efficacy emerged in female students between T1 and T2 (after receiving feedback, $d = 0.20$; 95% confidence interval, CI [-0.002; 0.411]) and between T1 and T3 ($d = 0.27$; 95% CI [0.001; 0.54]). There were no significant differences in self-efficacy between T2 and T3 (after engaging in service learning, $d = 0.07$; 95% CI [-0.212; 0.343]). For male students, levels of self-efficacy did not significantly change (T1 to T3, $d = 0.29$; 95% CI [-0.307; 0.888]; see Table 1).

Teaching self-efficacy over time

We also included gender as a Level 2 predictor in the multivariate multilevel model predicting teaching self-efficacy given significant mean differences in gender. Similar to the results for general self-efficacy, female students showed a significant increase in teaching self-efficacy between T1 and T2 (after receiving feedback, $d = 0.14$; 95% CI [-0.064; 0.351]) and between T1 and T3 ($d = 0.77$; 95% CI [0.497; 1.051]), but not between T2 and T3 (after engaging in service learning). Gender differences reached significance at T1 and T2, with female students reporting lower levels than male students, but not at T3 (see Table 2).

Gender as moderator

Male and female students differed significantly in their general self-efficacy at T1, $t(250) = 4.10$, $p < .001$, $d = 0.66$, 95% CI [0.337; 0.976], and T2, $t(84) = 2.06$, $p < .05$, $d = 0.36$, 95% CI [-0.13; 0.73], with male students indicating higher self-efficacy scores. There were no significant gender differences at T3, $t(195) = 1.91$, $p = .058$.

There were significant differences between male and female students in their teaching self-efficacy at T1, $t(76) = 2.51$, $p < .05$, $d = 0.39$, 95% CI [0.073; 0.702]. Male and female students did not differ at T2, $t(41) = 0.89$, $p = .380$, or T3, $t(23) = -0.19$, $p = .854$. Descriptive statistics regarding self-efficacy for all students are presented in Table 3.

Discussion

The aim of this study was to examine the effects of participating in a service learning seminar on students' general and teaching self-efficacy and to examine feedback and gender as possible moderators. Students reported significant increases in general ($d = 0.30$) and teaching ($d = 0.68$) self-efficacy after the seminar (T3) compared to before (T1). Positive effects of engaging in a service learning approach on students' self-efficacy have been found in other studies as well (Astin et al. 2000;

Table 1. Application of two-level models for a within-subject design with three assessments (T1, T2, T3) of general self-efficacy in female and male students

Model		Female students						Male students							
		Fixed			Random			Fixed			Random				
		Coef.	Est.	SE	<i>t</i>	<i>df</i>	Coef.	<i>SD</i>	Coef.	Est.	SE	<i>t</i>	<i>df</i>	Coef.	<i>SD</i>
1	Intercept	β_{00}	29.69	0.25	118.57***	275	r_{0i}	3.59***	β_{00}	31.90	0.52	118.57***	275	r_{0i}	3.59***
	T2	β_{10}	0.91	0.23	4.02***	275	r_{1i}	2.91***	β_{10}	0.11	0.50	0.22	275	r_{1i}	2.91***
	Gender	β_{01}	2.21	0.57	3.86***	254			β_{01}	-2.21	0.57	-3.86***	254		
	T3	β_{20}	1.50	0.33	4.48***	275	r_{2i}	2.97***	β_{20}	1.05	0.76	1.39	275	r_{2i}	2.97***
	Gender × T2	β_{11}	-0.80	0.55	-1.47	275			β_{11}	0.80	0.55	1.47	275		
	Gender × T3	β_{21}	-0.45	0.83	-0.55	275			β_{21}	0.45	0.83	0.54	275		
2	Intercept	β_{00}	30.60	0.29	106.25***	275	r_{0i}	3.89***	β_{00}	32.01	0.61	52.12***	275	r_{0i}	3.89***
	T1	β_{10}	-0.91	0.23	-4.02***	275	r_{1i}	2.91***	β_{10}	-0.11	0.50	-0.22	275	r_{1i}	2.91***
	Gender	β_{01}	1.41	0.68	2.08*	254			β_{01}	-1.41	0.68	-2.08*	254		
	T3	β_{20}	0.59	0.37	1.60	275	r_{2i}	3.44***	β_{20}	0.94	0.84	1.13	275	r_{2i}	3.44***
	Gender × T1	β_{11}	0.80	0.55	1.47	275			β_{11}	-0.80	0.55	-1.50	275		
	Gender × T3	β_{21}	0.36	0.91	0.39	275			β_{21}	-0.36	0.91	-0.39	275		
3	Intercept	β_{00}	31.19	0.38	82.89***	275	r_{0i}	3.88***	β_{00}	32.95	0.84	39.46***	275	r_{0i}	3.88***
	T1	β_{10}	-1.50	0.33	-4.48***	275	r_{1i}	2.97***	β_{10}	-1.05	0.76	-1.39	275	r_{1i}	2.97***
	Gender	β_{01}	1.76	0.92	1.92	254			β_{01}	-1.76	0.92	-1.92	254		
	T2	β_{20}	-0.59	0.37	-1.60	275	r_{2i}	3.45***	β_{20}	-0.94	0.84	-1.12	275	r_{2i}	3.45***
	Gender × T1	β_{11}	-0.35	0.91	-0.39	275			β_{11}	0.35	0.91	0.39	275		
	Gender × T2	β_{21}	0.45	0.83	0.54	275			β_{21}	-0.45	0.83	-0.54	275		

Note. Coef. = Coefficient in corresponding model equation; Est. = estimate (unstandardized regression coefficient).

* $p < .05$.

*** $p < .001$.

Table 2. Application of two-level models for a within-subject design with three assessments (T1, T2, T3) of teaching self-efficacy in female and male students

Model		Female students						Male students							
		Fixed			Random			Fixed			Random				
		Coef.	Est.	SE	<i>t</i>	<i>df</i>	Coef.	SD	Coef.	Est.	SE	<i>t</i>	<i>df</i>	Coef.	SD
1	Intercept	β_{00}	46.03	0.46	100.85***	269	r_{0i}	6.49***	β_{00}	48.47	0.93	52.26***	269	r_{0i}	6.49***
	T2	β_{10}	1.13	0.45	2.49*	269	r_{1i}	5.84***	β_{10}	-0.15	0.99	-0.15	269	r_{1i}	5.84***
	Gender	β_{01}	2.44	1.03	2.36*	254			β_{01}	-2.44	1.03	-2.36*	254		
	T3	β_{20}	5.69	0.70	8.17***	269	r_{2i}	6.82***	β_{20}	1.92	1.56	1.23	269	r_{2i}	6.82***
	Gender \times T2	β_{11}	-1.27	1.08	-1.17	269			β_{11}	1.27	1.08	1.17	269		
	Gender \times T3	β_{21}	-3.78	1.71	-2.21*	269			β_{21}	3.78	1.71	2.21*	269		
2	Intercept	β_{00}	47.16	0.48	97.80***	269	r_{0i}	6.41***	β_{00}	48.32	1.06	45.78***	269	r_{0i}	6.41***
	T1	β_{10}	-1.13	0.45	-2.49*	269	r_{1i}	5.86***	β_{10}	0.15	0.99	0.15	269	r_{1i}	5.87***
	Gender	β_{01}	1.17	1.16	1.01	254			β_{01}	-1.17	1.16	-1.01	254		
	T3	β_{20}	4.56	0.67	6.85***	269	r_{2i}	5.86***	β_{20}	2.06	1.54	1.34	269	r_{2i}	5.86***
	Gender \times T1	β_{11}	1.27	1.09	1.17	269			β_{11}	-1.27	1.09	-1.17	269		
	Gender \times T3	β_{21}	-2.50	1.68	-1.49	269			β_{21}	2.50	1.68	1.49	269		
3	Intercept	β_{00}	51.72	0.68	76.08***	269	r_{0i}	6.52***	β_{00}	50.38	1.53	32.87***	269	r_{0i}	6.52***
	T1	β_{10}	-5.69	0.70	-5.69***	269	r_{1i}	5.88***	β_{10}	-2.06	1.55	-1.33	269	r_{1i}	5.88***
	Gender	β_{01}	-1.34	1.68	-0.80	254			β_{01}	1.34	1.68	0.80	254		
	T2	β_{20}	-4.56	0.67	-6.83***	269	r_{2i}	6.82***	β_{20}	-1.91	1.56	-1.23	269	r_{2i}	6.82***
	Gender \times T1	β_{11}	2.50	1.68	1.49	269			β_{11}	-2.50	1.68	-1.49	269		
	Gender \times T2	β_{21}	3.78	1.71	2.21*	269			β_{21}	-3.78	1.71	-2.21*	269		

Note. Coef. = Coefficient in corresponding model equation; Est. = estimate (unstandardized regression coefficient).

* $p < .05$.

*** $p < .001$.

Table 3. Means, standard deviations, and ranges of students' self-perceived general self-efficacy and teaching self-efficacy at three assessments (T1, T2, T3)

Variable	N	M	SD	Range
General self-efficacy				
T1	267	30.02	3.88	10–40
T2	246	30.78	3.82	20–39
T3	114	31.18	3.78	19–39
Teaching self-efficacy				
T1	261	3.09	0.46	1.00–4.0
T2	243	3.15	0.44	1.47–4.0
T3	113	3.40	0.46	1.33–4.0

Note. General self-efficacy: 10 items, sum scores. Teaching self-efficacy: 15 items, mean scores, ratings from 1 (*not true*) to 4 (*true*).

Gerholz, Liszt, and Klingsieck 2018; Gubbels and Vitiello 2018; Osborne, Hammerich, and Hensley 1998; Reeb et al. 2010; Simons and Cleary 2006; Stewart 2008; Williams, King, and Koob 2002; Macías Gomez-Estern et al. 2021). Yet, there have been only two studies assessing general self-efficacy in the service learning context with the same standardized measure as used in the present study. Gerholz, Liszt, and Klingsieck (2018) reported a significant increase in self-efficacy with a large effect size, $d = 1.03$, whereas Reinders (2010) reported no additional effect of engaging in service learning on self-efficacy. At the same time, Reinders (2010) reported possible variance in self-efficacy ratings over time without reporting further details, complicating interpretation. Furthermore, both studies investigated only small samples, making generalization difficult.

The present study is the first to examine not only the effect of a service learning approach on general self-efficacy but also its effect on teaching self-efficacy in a large sample of students. When we compare our findings of increased teaching self-efficacy in students ($d = 0.77$ in female students, T1–T3) with the results of service learning research on domain-specific self-efficacy (Reeb et al. 2010; Simons and Cleary 2006; Stewart 2008), it appears that students benefit when engaging in service learning and female students in particular, as can be seen in significant increases in self-efficacy over the course of the semester.

As could be expected, general and domain-specific self-efficacy were closely linked, yet not redundant. Interestingly, domain-specific self-efficacy—the belief in being able to maintain adequate classroom management even in the face of obstacles—increased significantly, even before students conducted the school program. One could assume that the very hands-on support and tutoring led to students feeling well prepared. In our study, tutors were three graduate students who had participated in the seminar when they were undergraduate students. Thus, they were able to make authentic connections between previous knowledge and current experiences and tasks, enhancing students' reflection skills and enabling them to improve their knowledge and self-efficacy (see Bernadowski, Perry, and Del Greco 2013). However, the specific mechanisms of change and the importance of engaging tutors in service learning experiences still remain somewhat unclear and warrant further research, for example, examining frequency of tutoring and age differences between tutors and tutees.

Past research indicated positive effects of increased self-efficacy such as higher motivation to engage in future service learning experiences (see Giles and Eyler 1994; Reeb 2006) and an increased likelihood of community-engagement in the future (Reeb et al. 1998). Even though we did not assess immediate outcomes of engaging in service learning apart from self-efficacy, past research indicates there could be further positive outcomes in the future, such as improved understanding of social issues, personal insight, and cognitive development (see Yorio and Ye 2012). Overall, the positive impact of engaging in service learning on students is well documented (Chan, Ngai, and Kwan 2019; Kuh 2008; Macías Gomez-Estern et al. 2021; Rama et al. 2000; Salam et al. 2019; Yorio and Ye 2012), and it has been indicated that service learning leads to a deeper understanding of relevant course content in students (see Bringle and Hatcher 1996).

In a meta-analysis of service learning, the opportunity for ongoing reflection was found to be an important moderator of student success (Conway, Amel, and Gerwien 2009); thus, supervision and feedback are necessary elements of successful service learning experiences. The approach we took in our study, assessing data at three time points, is comparable to that of Shin et al. (2018). Whereas most research in service learning has focused on giving feedback on students' reflections after they engage in service learning, this study investigated the impact of feedback within a semester. However, Shin et al. (2018) did not specifically assess if feedback occurred, instead reporting a link between self-rated amount of feedback and higher commitment to purpose and higher social contribution in students with low motivation. Our findings complement their results: Providing feedback midsemester to all students in our study was associated with a consequent and significant increase in self-efficacy, strengthening the empirical evidence between feedback and self-efficacy. Our empirical results supporting the importance of feedback in service learning for self-efficacy are in line with those of other studies (Conway, Amel, and Gerwien 2009; Sanders, Van Oss, and McGeary 2016). Sanders, Van Oss, and McGeary (2016) found structured reflection with consequent written feedback linked to higher general and community-service self-efficacy. In a South Korean study, Shin et al. (2018) indicated that providing feedback was linked to the concept of confidence in purpose, which was assessed with a similar wording to the assessment of self-efficacy.

Regarding gender differences, the significant increase in both general (T1–T3, $d = 0.27$) and teaching (T1–T3, $d = 0.77$) self-efficacy in female but not male students needs to be interpreted with care. Significant gender differences in self-efficacy ratings, with males scoring higher than females, were also found in the general population (Hinz et al. 2006). At first sight, higher means can be found in both males and females in their teaching self-efficacy after the seminar compared to before, with a seemingly stronger increase over the course of the seminar in female students. However, this difference was not significant in male students. This resembles another study in undergraduate students working with schoolchildren (Stewart 2008) in which female participants benefitted more than their male counterparts in terms of increased self-efficacy. Although the increase in self-efficacy can be found in female students, the small sample size of male students at T2 ($n = 34$) and T3 ($n = 14$) does not allow for conclusions about the program's effects on male students. At the same time, this study gives important information about gender as a possible moderator of self-efficacy when participating in service learning. This was mentioned as lacking elsewhere (Bordelon and Phillips 2006) and complements the findings reported in a review on self-efficacy in service learning community action research (Reeb et al. 2010). A larger sample of male students is needed to examine further differential effects.

Another strength of this service learning seminar is that participation in the seminar was mandatory. This makes it possible to draw wider conclusions than those of Reeb (2006), who found positive effects of service learning only in students with initial high levels of self-efficacy (Reeb 2006). The strength of the mandatory status was thus that the study could include students with a wide range of self-efficacy levels and indicated that students with low levels of self-efficacy benefitted as well. Further, as Chan, Ngai, and Kwan (2019) reported, mandatory service learning seminars at university led to positive outcomes in all students independent of their initial inclination or even interest in the subject. At the same time, one needs to differentiate between a mandatory seminar applying the service learning approach as in the present study, and mandatory service learning programs.

Within this seminar, service learning was the pedagogical approach. Often, seminars applying service learning seem similar to seminars applying an experiential learning or problem-based approach. The main differences between these approaches are the reciprocal nature of service learning, the aim of enhancing students' understanding of theoretical knowledge through their engagement in the community, and the reflection on that experience (Salam et al. 2019; for a comprehensive differentiation between these approaches see Resch 2021). Notably, when engaging in service learning experiences in schools, university students are confronted not only with new skills

they have to acquire but also with pupils from diverse backgrounds and with different needs (e.g. Mergler et al. 2017; Resch and Schrittmesser 2021).

Limitations and outlook

The results of this study need to be interpreted in light of some limitations. The present study focused on the construct of self-efficacy, which is a well-established construct in service learning research. Although this study added valuable information on detailed changes in self-efficacy in a large cohort of students using a standardized questionnaire, one limitation is that it relied on self-efficacy as the only outcome measure. Even though we did not assess immediate outcomes of engaging in service learning apart from self-efficacy, one could assume an increased likelihood of future community engagement (e.g. Reeb et al. 1998).

Further, gaining knowledge and academic performance, which are more related to university and student academic success, were not considered. Yet increases in general and teaching self-efficacy might in turn affect students' academic performance: Self-efficacy is linked to multiple positive outcomes such as higher student satisfaction and better academic achievement (e.g. Doménech-Betoret, Abellán-Roselló, and Gómez-Artiga 2017). Future studies should include larger samples and focus on further possible moderators of self-efficacy.

Additionally, the current study examined changes in students' self-efficacy solely within one semester. In order to trace longer lasting effects of service learning on students' outcomes, long-term follow-up assessments should be considered in future studies.

Because of the lack of a control group, effects of other relevant factors during the semester (e.g. other seminars, individual factors, life events) on students' self-efficacy cannot be ruled out and might reduce the interpretability of the present results. However, two points have to be made: First, participating students did not have any experiential education experience at the university before this seminar, consequently ruling out previous experience impacting the increase in self-efficacy. Second, general self-efficacy is defined as a trait with stable levels over the lifetime (Schwarzer and Jerusalem 1995). Thus, increasing self-efficacy—as was found in the majority of students in this study—can be seen as important and meaningful. Therefore, the results of the present study strongly suggest a positive link between engaging in service learning and students' general self-efficacy.

Conclusion

Using a service learning approach within a seminar at a university is a promising way to strengthen self-efficacy in students. When analyzing service learning experiences in higher education, we found evidence that emphasizes the importance of continuous feedback and ongoing reflection on students' self-efficacy.

Disclosure statement

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

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