Self-efficacy for learning beliefs in collaborative contexts: relations to pre-service early childhood teachers' vicarious teaching self-efficacy

Eunice Pui-yu Yim*

School of Education and Languages, Hong Kong Metropolitan University, Ho Man Tin, Hong Kong SAR,
China

The importance of academic self-efficacy generally outweighs social self-efficacy in teacher training in academia. Given the teaching profession is collaborative career, social self-efficacy should play a significant role in the success of teacher training within and outside of academia. Students taking an early childhood teacher training program in a tertiary institute in Hong Kong ($N = 513$) responded to survey items concerning three personal self-efficacy for learning variables (academic self-efficacy, social self-efficacy and control of learning) and vicarious experiences as a source of teaching self-efficacy. Academic self-efficacy, social self-efficacy and control of learning were found to be (1) related but distinctive to one another, and (2) positively related to vicarious experiences as a source of teaching self-efficacy. Practicum experience was found to have no significant impact on any of the personal self-efficacy for learning variables and the social-oriented vicarious source of teaching self-efficacy. This study suggested that as a source of teaching self-efficacy for pre-service teachers, vicarious experiences could be as important as experiences of teaching skills mastery. Moreover, practicum that does not optimize the interplay of personal self-efficacy for learning variables with vicarious experiences as a source of teaching self-efficacy, and does not fully consider cultural sensitivities, would not contribute significantly to teachers' learning and social competence. The development of different domains of self-efficacy is not only affected by different sources of teaching self-efficacy but also varies between pre-service and experienced teachers. This study renewed the existing understanding of the reciprocal influences of personal self-efficacy for learning and vicarious experiences as a source of teaching efficacy, which can be fostered by teacher education programs. Future studies will be required to explore the culturalization of sources of teaching self-efficacy, how different components of personal self-efficacy for learning change over career stages and time, and how the transfer of learning between practicum and academia can be further enhanced.

KEYWORDS

self-efficacy for learning, vicarious experiences, social self-efficacy, teacher training, practicum

Introduction

Teaching is a collaborative profession that requires a high degree of interpersonal and communication skills. It is reasonable to assume that social competence should play a crucial role in contributing to professional teacher development and career commitment. There is tremendous research which show that mastery experiences, one of the four major sources of teaching self-efficacy, and practicum experience contribute significantly to pre-service teachers' academic self-efficacy and teaching technique training. However, existing literature has rarely explored the conducive factors in promoting personal self-efficacy for learning from a social perspective in pre-service teacher training. This study investigated (1) the interplay between personal factors and social-oriented sources of teaching self-efficacy in training competent teaching, and (2) impact of practicum in training both learning and social competent teachers.

Self-efficacy

Bandura (1997, 79) defines self-efficacy as 'the conviction that one can successfully execute the behavior required to produce the outcomes'. Further self-efficacy studies explain that perceived efficacy judgement is domain-and task-specific, with a set of mastery criteria that lead to courses of action towards the accomplishment of goals. Students can develop and acquire different types of self-efficacy, depending on the type of training a student receives and the level of achievement the student obtained in that particular type of training (Stipanovic et al., 2017). Perceived capable learners in one type of self-efficacy does not necessarily guarantee a similar degree of self-efficacy in the other type of self-efficacy. While professional teaching is a profession that requires academic training and collaborative effort, it is reasonable to assume that the development of both academic and social self-efficacy are equally important to professional teacher training, and high academic-related self-efficacy does not guarantee high social-related self-efficacy.

Academic self-efficacy

Academic self-efficacy is a domain-specific construct that concentrates on students' judgments of their capabilities in relation to goals and standards, based on one's past academic experiences and mastery rather than in comparison with others' capabilities (Marsh et al., 2018). Academic self-efficacy has a direct relationship with one's learning motivation and engagement, which is demonstrated in behavioral means wherein students' learning can manifest in visible and practical ways (Zhen et al., 2017). Studies on academic self-efficacy revealed that individuals with high academic self-efficacy are more likely to accept challenges and obtain satisfaction by utilizing different learning strategies (Bandura, 1997; Drago et al., 2018). On the contrary, students with low academic self-efficacy are more inclined to interpret challenges as threats and hinder themselves from engaging in the learning process, both visible in behavioral means and invisible in cognitive means (Marsh et al., 2018).

Research has shown that high self-efficacy in academic learning may maximize one's likelihood of attaining designated levels of academic attainment (McLennan et al., 2017). Academic self-efficacy beliefs focus on one's perceived capability to deploy the most effective learning strategies in response to the task demand at hand. Additional studies conducted in various learning contexts such as vocational training found that academic self-efficacy alone does not guarantee learning success. Studies revealed that a high degree of collaborative effort is a critical factor in every aspect of school success, including school management, morale, quality of education, and teacher's professionalism (Anderson and Betz, 2001). With this, teachers' self-efficacy in contributing to school success should be attributed to teachers' beliefs in their capacity to work with others and maximize each other's potentials. Hence, professional teacher training should enable students to apply both academic and social skills in a collaborative context.

Social self-efficacy

Human beings are social agents who engage in social contexts wherein people relate to one another mentally and physically, both in academia and in the workplace (Anderson and Betz, 2001). While academic self-efficacy focuses on one's conviction to perform successfully at designated levels, social self-efficacy focuses on building and maintaining interpersonal relationships, which may contribute to effective learning at higher education that emphasizes collaborative learning (Anderson and Betz, 2001). Within the context of vocational training, social efficacy for learning refers to students' beliefs of their performance in academic situations that involve social interactions, emphasising the relationship between social and academic self-efficacy (İskender and Akin, 2010). Competent teachers do not rest only on academic learning, but also on behaving appropriately with others and establishing and maintaining social interactions in social settings (İskender and Akin, 2010).

Collective self-efficacy is a type of social self-efficacy that concerns judgments people make about groups and their capabilities and effectiveness in specific domains of action (Bandura, 2005). It suggests that a group's attainments are the product not only of shared knowledge and skills of the different members, but also of the interactive, coordinative, and synergistic dynamics of their transactions (Klassen et al., 2010). Therefore, perceived collective efficacy is not simply the sum of the efficacy beliefs of individual members. Rather, it is people acting coordinately on a shared belief as a group operating through the behavior of its members (Klassen et al., 2010). In the teaching profession, teachers' beliefs in their capacity to effectively manage interpersonal relationships with other school members strongly influence the quality of education provided to students (Caprara et al., 2006). Teachers operate collaboratively within an interactive social system rather than as isolates (Bandura, 1993). The collaborative effort of staff within a school system significantly contributes to how well schools function as an organization and students' learning (Cascio et al., 2014).

A review of existing literature on collective efficacy revealed that there are two common approaches in measuring collective efficacy: individual and group level. At the individual level, individual members' appraisals of their personal capabilities to execute the particular functions they perform in the group are measured; at group level, members' appraisals of their group's capability of operating as a whole are measured (Fida et al., 2015). The two approaches' measurement of perceived collective efficacy differ in the relative

weight given to individual factors and holistic interactive ones. However, they are not as distinct as they might appear when measuring the source of collective self-efficacy and the level of the phenomenon (i.e., personal efficacy or group efficacy; Cascio et al., 2014). They are interdependent and exert influence reciprocally on group performance (Schwarzer, 2014). In order to reflect the two approaches in collective efficacy measurement, this study measured social self-efficacy to assess individual's perceived capability over maintaining social relationships in collaborative settings at holistic group level. Perceived control of learning in learning contexts was measured to assess individuals' perceived control of learning in immediate contexts where unpredictable social dynamics occur.

Control of learning

Perceived control refers to generic beliefs about the internality or externality of causality (Cascio et al., 2014). According to causal attribution theory, internal locus of control concerns the level and strength of personal efficacy to produce changes by perseverance and creative use of capabilities and resources. On the other hand, external locus of control concerns the modifiability of the environment (Gist and Mitchell, 1992). People's attribution of causes affects their behaviors in two major aspects: behavioral and emotional.

At the behavioral level, people with high perceived internal locus of control tend to have a firmer belief in their efficacy (Bandura, 1986). People figure out ways to exercise a level of control over events, through self-control, self-regulation, ingenuity and perseverance (Fida et al., 2015). When involved in environments containing limited opportunities and many constraints, people with a strong belief in their internal locus of control engage more in self-regulation, deploy more effective coping strategies, and tend to feel less susceptible to stress and depression (Jex and Bliese, 1999).

At the emotional level, the level of perceived control over one's environment has a direct relationship with one's perceived abilities in stress management — particularly in the area of controlling one's negative thoughts that produces stress, reducing or turning off anxiety, and re-framing them into positive thoughts (Ozer and Bandura, 1990). With higher perceived control over emotions, individuals are less likely to engage in avoidant behavior, more likely to find alternative behavioral responses, and more likely to maximize the internal locus of control of a situation. In doing so, they are more capable of developing social relationships with workmates and enhancing collaborative performance at work (Fida et al., 2015).

Competent teachers require teaching knowledge, skills and high degree of collaboration with teammates, in order to deliver high quality education to students. Given pre-service teachers possess less teaching experience than their experienced counterparts, it is reasonable to assume that their source of teaching self-efficacy should not rely on a mastery of teaching skills, but on sources that can demonstrate essential qualities of a professional teacher's practical teaching skills and collaboration abilities. Existing studies on teacher training revealed that perceived control over interpersonal relationship at workplace are much more salient in the teaching self-efficacy beliefs of novice teachers. Hence, there is a dire need not only to explore the interplay between academic self-efficacy, social self-efficacy and perceived of control, but also how these factors can be promoted within the context of a collaborative career.

Teaching self-efficacy

To function well in teaching contexts, students pursuing a teaching career through teacher education programs are expected to demonstrate their academic attainment, confidence in achieving a designated academic level and, at the same time, their mastery of teacher training contents (Huong et al., 2020). Teaching self-efficacy is a career specific domain, composed of four major sources of teaching related self-efficacy: mastery experiences, vicarious experiences, social persuasion and physio-emotion arousal (Bandura, 1997). Mastery experiences refer to one's own subjective interpretation of previous attainment; vicarious experiences refer to observing other people's performance; social persuasions refer to people receiving comments from others on their performance; and physio-emotional arousal refers to the influence of people's different physiological and emotional arousal on their beliefs about their self-competence (Bandura, 1997).

A review of existing literature suggested that, among the four sources of teaching self-efficacy, mastery experiences have proven to be the most potent source of influence on teaching self-efficacy, whilst physio-emotion exert the least influence (Tschannen-Moran and Hoy, 2007). Mastery experiences, provided through direct teaching experience, are no doubt a source of teaching self-efficacy. Besides mastery experiences, studies found that vicarious experiences are also a source of teaching self-efficacy. Vicarious experiences are also provided through practical teaching experience, but in a less direct way in which teachers learn from observing models of teaching. While there is a general belief that mastery experiences exert greater impact on teacher's teaching self-efficacy than vicarious experiences, even though both sources share practical teaching in nature, studies on their impacts revealed that these sources impact experienced and novice teachers differently (Tschannen-Moran and Hoy, 2007). Research suggested that experienced teachers have more opportunities to engage in practical teaching experiences, which inevitably strengthens their mastery and similar sources of teaching self-efficacy. In contrast, since novice teachers have fewer mastery experiences, other sources of self-efficacy should exert more impact in promoting teaching self-efficacy. As pre-service teachers generally do not have a lot of field experience, they gauge their capabilities in relation to similar others' evaluation on their performance. It is therefore reasonable to assume vicarious experiences would exert considerable influence on teachers' perceived teaching self-efficacy when they feel similar to the model and situation in question (Lent et al., 2017).

Social cognitive theory (Bandura, 1997) maintains that the greater the strength of in-group projection, the greater the chance of developing in-group homogeneity and cohesion with perceived in-group members, namely similar others (Yim, 2015). With this, an individual's in-group identity arises when the individual affiliates themselves with a social group and develops an 'us' identity with the group (Richardson and Watt, 2018). When a need for social connectedness is activated, one's motivation to act like, or compare against, the affiliated others increases. The higher the evaluation students receive on their behavior from the identified model, the greater the impact on their self-efficacy in the profession. The impact of the model's evaluation on the observer's efficacy beliefs depends on the degree to which the observer identifies with the model. Hence, vicarious experience is a social-oriented source of teaching self-efficacy in which individuals identify models or significant people

they trust, which can boost their confidence and competence beliefs in related areas. Vicarious experience can thus be a powerful social source of teaching self-efficacy, which exerts significant influence on teachers' social self-efficacy in teacher development when the source is accompanied by conditions such as academic self-efficacy and perceived control for learning (Won et al., 2017). Together, this can help bring about career success. While there is no doubt that pre-service teachers can acquire mastery experiences of teaching in practicum, which would contribute to their teaching skill application competence, the transferability and contribution of social-oriented sources of teaching self-efficacy to social self-efficacy, perceived control of learning and academic self-efficacy has rarely been investigated.

The role of practicum

Practicum is a way for students to gain experience in a workplace relevant to their program of study and career aims (Huong et al., 2020). Compared with academic learning, practicum offers pre-service teachers a distinguishable but related level of skills. It gives students the opportunity to apply their academic knowledge to a real life setting, preparing them to become competent teachers (Kieffer and Henson, 2000; Gloudemans et al., 2012). Under the supervision and mentoring of more experienced teachers at the workplace, the benefits of practicum are twofold. Firstly, the novice has a chance to gain mastery experiences and deploy their acquired knowledge and skills in practice. Secondly, the novice benefits from observing experienced others in the same profession, allowing them to gain self-efficacy from vicarious experiences on both skills of teaching and maintaining interpersonal relationships in a collaborative context (McLennan et al., 2017).

Part of the program design, practicum is proven to be an effective strategy in enhancing practical training, wherein the sources of teaching self-efficacy lie (Robbins and Krueger, 2005). It is clear that practicum may influence self-efficacies of a practical nature, particularly mastery experiences of teaching skills. The extent to which the social-oriented vicarious experiences source of teaching self-efficacy, acquired through practicum experiences, can contribute to the development of academically and socially competent teachers, remains underexamined (Rupp and Becker, 2021). To resolve the gap in the existing literature about the role of practicum in promoting academic and social competence in professional teacher training in collaborative settings, this study aims to analyze the extent and interplay between personal self-efficacy for learning beliefs (perceived control of learning, social self-efficacy and academic self-efficacy), vicarious experiences as a source of teaching self-efficacy, and practicum in a teacher training program.

The present investigation

The overarching aim of the study was to investigate the relationships between personal self-efficacy for learning beliefs (control of learning, social self-efficacy, academic self-efficacy), vicarious experiences as a source of teaching self-efficacy, and practicum. Specifically, the study will answer the following research questions (RQs):

1. Can personal self-efficacy for learning factors (control of learning, social self-efficacy, academic self-efficacy) be clearly distinguished from one another?
2. Are the three personal self-efficacy for learning factors related to the vicarious experiences source of teaching efficacy?
3. What is the role of practicum in promoting personal self-efficacy for learning and vicarious experiences as a source of teaching self-efficacy?

Methods

Participants

Pre-service early childhood teachers enrolled in a 2-year full-time teacher education program in Hong Kong participated in the survey research ($N = 513$). All participants completed the survey and missing data were minimal (<1%). Of the participants, 96.7% were female, which is similar to the Hong Kong early childhood teacher population (Chen and Rao, 2011). Majority of the participants were between 18 and 24 years old (96.1%), and 3.7% of them were between 25 and 34 years old. The sample consisted of 4 groups of students (group 1 and 2 had no practicum experiences; group 3 and 4 completed mandatory 320-h practicum experiences with no less than 56 independent teaching hours). During the practicum, students are expected to perform the role for teaching assistant in the beginning of the practicum; partnered teacher with another experienced classroom teacher in the middle of the practicum; and a classroom teacher who can manage and teach a class of children independently and professionally by the end the practicum.

Materials

The survey was designed to understand pre-service early childhood teachers' personal self-efficacy for learning (control of learning, social self-efficacy and academic self-efficacy) and its relationship with vicarious experiences as a source of teaching self-efficacy, and the role of practicum within these relations. The survey was composed of five main parts: (1) control of learning, (2) social self-efficacy, (3) academic self-efficacy, (4) vicarious experiences source of teaching self-efficacy, and (5) practicum. Items for parts 1–4 were adopted from three validated tools: College Self-Efficacy Inventory (CSEI; Kieffer and Henson, 2000), Motivated Strategies for Learning Questionnaire (MSLQ) instrument (Pintrich et al., 1991), and Sources of Self-Efficacy Inventory (SOSI; Bandura, 1997), respectively. Part 5 on practicum is a dichotomous measurement to differentiate between participants who have or have not completed their practicum.

Control of learning

Four items from the MSLQ were used. This scale reflects the respondents' perceived competence in social relationships. For example: 'Considering the difficulty of this program, the teacher, and my skills, I think I will do well in this program.'

Social self-efficacy

Four items from the CSEI were used (Kieffer and Henson, 2000). This scale also reflects the respondents' perceived competence in social relationships. For example: 'How confident are you that you could successfully participate in class discussion?'

Academic self-efficacy

Four items from the CSEI were used (Kieffer and Henson, 2000). This scale reflects the respondents' perceived competence in academic work. For example: 'I expect to do well in this program'.

Vicarious experiences

Vicarious experiences is a scale in the SOSI instrument (Kieffer and Henson, 2000). The items were pilot tested to reduce the length of the instrument while maintaining reliability. Four items were used for this vicarious experiences scale. For example: 'Watching other teachers make mistakes has taught me how to be a more effective teacher.'

Practicum

Practicum was a single-item measure differentiating participants who had not and those who had started or completed the teaching practicum. The dichotomous measure was coded 1 (no practicum) and 2 (practicum started or completed).

Procedure

Informed consent was obtained before the survey was administered. Printed surveys and instructions were distributed to students in class. Instructions included information about the purposes of the study, anonymity, and their right to withdraw from the study any time. The survey was a shorter version of an initial piloted survey with another cohort earlier. The completed survey responses were entered and transformed into SPSS for analysis (Field, 2013).

Data analysis

The survey responses were coded such that higher scores reflected stronger beliefs. First, Cronbach's alpha reliability was estimated for each *a priori* factor, followed by a principal components analysis with 16 items for the four factors. This exploratory factor analytic approach was deemed appropriate to provide a preliminary test of the factors. After this analysis of an exploratory nature, confirmatory factor analysis (CFA) was conducted. A series of models was tested, which started with Model 1 testing the ability of the 16 items to form the four *a priori* factors (control, academic, social, and vicarious self-efficacy). To scrutinize the four-factor model, Model 2 tested whether the 16 items could form one personal self-efficacy factor and one teaching self-efficacy factor. To further scrutinize Model 1, a third model (Model 3) tested whether all the items could form a single self-efficacy factor. A comparison of the three models' model fit indices would enable us to determine which would be the best model for representing the data.

The procedures for conducting CFA have been described elsewhere (Jöreskog and Sörbom, 2006), so they are not detailed here. The goodness of fit of models was evaluated by observing the Tucker-Lewis index (TLI, also known as the non-normed fit index) as the primary goodness-of-fit index. However, the chi-square statistics, root mean square error of approximation (RMSEA), and comparative fit index (CFI) are also reported. In general, for an acceptable model fit, the values of TLI and CFI should be equal to or >0.90, whereas 0.95 may be taken as an excellent fit. For RMSEA, according to Schunk and Pajares (2002), a value of 0.05 indicates a close fit and values close to 0.08 indicate a fair fit. In short, based on commonly accepted criteria (see Browne and Cudeck, 1993; Jöreskog and Sörbom, 2006), an acceptable model would show an acceptable model fit (i.e., TLI and RNI = 0.90 or above and RMSEA<0.08), acceptable factor loading for each item pertaining to its respective factor (>0.30), and reasonable correlations among the latent factors.

Based on the factors established in the CFA models, we are able to examine the relation of each personal factor to the vicarious source of teaching self-efficacy factor. To test whether the factors could be generalized across different groups of students with and without practicum experience, a multivariate analysis of variance (MANOVA) was conducted with the scores of the four factors. Finally, we also examined the factor correlations for different groups of students to further scrutinize the generalizability of the correlation pattern for the four factors examined.

Results

Preliminary analysis

A preliminary estimate found reasonably good Cronbach's alpha reliability for each of the four factors: Control of learning (4 items, alpha = 0.72, $M = 6.08$, $SD = 1.21$); academic self-efficacy (4 items, alpha = 0.91, $M = 6.35$, $SD = 1.44$); social self-efficacy (4 items, alpha = 0.90, $M = 6.16$, $SD = 1.51$); vicarious teaching efficacy (4 items, alpha = 0.85, $M = 6.11$, $SD = 1.26$). All alpha values were above 0.70.

Principal components

The analysis included 16 items for four factors (control, academic, social, and vicarious self-efficacy). The four factors were yielded and were well-defined, explaining 71.2% of variance (Peres-Neto et al., 2005). The factors loadings respective to each factor were all above 0.4. This result suggests that we would expect to obtain four factors from further analysis.

CFA

A series of CFA models was tested (Table 1). Model 1, testing the ability of 16 items to form four factors, had an acceptable fit.

Model 2 (Table 1), testing five factors and assuming vicarious as a single factor, resulted in a reasonable fit (TLI > 0.91, CFI > 0.93, RMSEA <0.08). Neither Model 2 assuming two factors (TLI < 0.80, CFI = 0.77, RMSEA = 0.14) nor Model 3 assuming a single factor (TLI = 0.70, CFI = 0.74, RMSEA = 0.16) had a comparable fit. Hence Model 1 was taken as the best fitting model for further analysis. The solution of Model 1 is presented in Table 2 in which the factor descriptive statistics and reliability estimates for the validated factors are also presented.

Factors and their relations

As can be seen in Table 2, the factor loadings were all acceptable (>0.3) (de Mesquita et al., 2021). The lowest was 0.43 and the highest

was 0.91. Table 2 also shows the correlations among the four factors derived from Model 1. All four factors were positively correlated (*r*s ranging from 0.64 to 0.73) but clearly distinct from each other (<0.9). Hence for RQ1, personal self-efficacy for learning variables (control of learning, social self-efficacy and academic self-efficacy) are clearly distinguishable from one another.

The critical correlations of interest in our study are those between vicarious experiences self-efficacy and the other variables. As Table 2 shows, the correlations were positive and very similar (*r*s = 0.67, 0.67, and 0.64, respectively, with control, social, academic). Hence for RQ2, all these three personal self-efficacy for learning factors are positively related to the vicarious source of teaching efficacy.

To answer RQ3, the scores of the items for each factor were averaged to form a factor score which was then compared across the different groups of students (Table 3). The MANOVA with the four established factors as dependent variables and class as an independent variable found no between-group difference in any of the dependent variables. Hence to answer RQ3, there were no mean differences among the various groups in any of the four variables. All scores were above the mid-point of the 10-point scale (lowest being 5.91 in Table 3), indicating that irrespective of group, the students in this sample were high in all variables.

The correlation in Table 4 revealed significant positive correlations between all pairs of variables: control of learning belief, social self-efficacy, academic self-efficacy and vicarious source of teaching efficacy. Table 5 presented the minimum factor loadings for the items in the study. Factor loadings indicated the strength of the relationship between each item and the underlying factor it was intended to measure. The factor loadings ranged from a minimum of 0.08 to maximum of 0.799. For the academic self-efficacy factor, the item with

TABLE 1 Goodness of fit of models.

Model	χ^2	*df*	TLI	CFI	RMSEA
1. 4 factors (3 self-efficacies +1 teaching self-efficacy)	453.42	98	0.91	0.93	0.08
2. 2 factors (1 self-efficacy +1 teaching self-efficacy)	1404.09	104	0.80	0.77	0.14
3. 1 factor	1100.92	103	0.70	0.74	0.16

N = 513. CFI, comparative fit index; TLI, Tucker-Lewis index; RMSEA, root mean square error of approximation.

TABLE 2 Solution of 4-factor model (model 1).

	Control	Academic	Social	Vicarious	Uniqueness
Mean	6.08	6.35	6.16	6.11	
SD	1.21	1.44	1.51	1.26	
Alpha	0.72	0.91	0.90	0.85	
Factor loadings					
Control 1	0.69*				0.52*
Control 2	0.43*				0.82*
Control 3	0.82*				0.33*
Control 4	0.55*				0.70*
Academic 1		0.81*			0.34*
Academic 2		0.83*			0.33*
Academic 3		0.88*			0.23*
Academic 4		0.83*			0.30*
Social 1			0.73*		0.47*
Social 2			0.76*		0.42*
Social 3			0.91*		0.18*
Social 4			0.90*		0.18*
Vicarious 1				0.73*	0.47*
Vicarious 2				0.82*	0.33*
Vicarious 3				0.75*	0.44*
Vicarious 4				0.77*	0.41*
Factor correlations					
Academic	0.65*				
Social	0.73*	0.73*			
Vicarious	0.67*	0.67*	0.64*		

N = 513. *p < 0.05. Unique = Uniqueness.

TABLE 3 MANOVA results.

Variable		Group 1	Group 2	Group 3	Group 4	F (3, 509)	MSE	p	η^2
	N	150	148	155	60				
Control	M	6.12	6.09	6.00	6.20	0.47	1.46	0.70	0.00
	(SD)	(1.27)	(1.19)	(1.24)	(1.01)				
Academic	M	6.30	6.44	6.30	6.41	0.34	2.08	0.80	0.00
	(SD)	(1.39)	(1.50)	(1.47)	(1.35)				
Social	M	6.07	6.20	6.11	6.40	0.78	2.27	0.51	0.00
	(SD)	(1.52)	(1.56)	(1.53)	(1.26)				
Vicarious	M	6.19	6.27	5.91	6.02	2.42	1.58	0.07	0.01
	(SD)	(1.33)	(1.26)	(1.20)	(1.22)				

Group comparisons were not statistically significant at $p = 0.05$.

TABLE 4 Correlations of variables in 4 groups.

		Control	Academic	Social
Group 1	Academic	0.36**		
	Social	0.31**	0.56**	
	Vicarious	0.44**	0.52**	0.39**
Group 2	Academic	0.58**		
	Social	0.53**	0.72**	
	Vicarious	0.49**	0.60**	0.60**
Group 3	Academic	0.55**		
	Social	0.57**	0.71**	
	Vicarious	0.65**	0.72**	0.67**
Group 4	Academic	0.37**		
	Social	0.37**	0.67**	
	Vicarious	0.34**	0.54**	0.64**

**$p < 0.001$.

the lowest factor loading was Q11 (If I try hard enough, I will understand the teaching material), with a minimum factor of 0.1; for the control of learning factor, the item with the lowest factor loading was Q36 (I remember clearly those times when I have taught groups well), which had a minimum factor of 0.08; for the social self-efficacy factor, the item with the lowest factor loading was Q37 (I have learnt about how to be a teacher by watching other skillful teachers), with a minimum factor loading of 0.568; for the vicarious source of teaching self-efficacy factor, the item with the lowest factor loading was Q5 (If I study in appropriate ways, I will be able to learn the materials in the programme), which had a minimum factor loading of 0.667.

Separate one-way ANOVA of four factors across different groups were conducted. The ANOVA results in Table 6 indicated that a non-significant effect of control of learning beliefs between groups ($F = 0.634$, $p = 0.593$). Therefore, there was no significant variation in control of learning beliefs across different groups.

The ANOVA results in Table 7 indicated that a non-significant effect of social self-efficacy between groups ($F = 1.392$, $p = 0.244$). Since value of p was >0.05, the level of significance, null hypothesis was not rejected. Hence, there was no sufficient evidence to support the claim that there was no significant variation in social self-efficacy across different groups.

The ANOVA results in Table 8 indicated that a non-significant effect of academic self-efficacy between groups [F (3, 509) = 0.498, $p = 0.684$]. Since value of p was greater than 0.05, the level of significance, null hypothesis was not rejected. Hence, there was no sufficient evidence to support the claim that there was no significant variation in academic self-efficacy across the different groups.

The ANOVA results in Table 9 showed that a non-significant effect of vicarious source of teaching self-efficacy between groups ($F = 2.272$, $p = 0.073$). Since value of p was greater than 0.05, the level of significance, null hypothesis was not rejected. Hence, there was no sufficient evidence to support the claim that there was no significant difference in vicarious source of teaching self-efficacy across the different groups.

Discussion

Distinguishable but related personal self-efficacy factors

The distinctive but related nature of personal self-efficacy for learning variables, including control of learning, social-self-efficacy and academic self-efficacy, suggests that the competency of these three factors are developed separately and are associated with one another.

Although academic self-efficacy in this study refers to students' general judgments of their capability in relation to academic goals and standards based on one's past academic experiences and mastery frames rather than in comparison with others' capability, academic self-efficacy should not be considered as a perceived competence that is confined to internal cognitive processes such as analytical and self-regulation skills, and unrelated to external factors (Zimmerman, 1995). Learning is an interactive process between oneself and the environment, which is characterized by the ever-changing dynamics within oneself and between the self and the learning environment. Among internal and external control of learning, external control of learning is more unpredictable and varied across time and situations. When facing external control of learning, individuals should be capable in identifying factors and resources that can indirectly, if direct influence is not possible, affect their own learning.

Social efficacy consists of skills that enable effective communication and interpersonal relationships, not merely based on how much an individual can adapt to the group — which is always

TABLE 5 Minimum factor loadings.

	Academic self-efficacy	Control of learning beliefs	Social self-efficacy	Vicarious source of teaching self-efficacy
Q11		0.1		
Q14		0.732		
Q17			0.799	
Q18			0.761	
Q19	0.578			
Q20			0.76	
Q21			0.659	
Q22			0.581	
Q23	0.644			
Q24	0.754			
Q25			0.76	
Q26			0.76	
Q27			0.761	
Q28			0.76	
Q29	0.753			
Q30	0.753			
Q31	0.754			
Q32	0.754			
Q36				0.08
Q37				0.568
Q41				0.653
Q45				0.777
Q49				0.653
Q5		0.667		
Q54				0.743
Q58				0.705
Q61				0.706
Q65				0.533
Q8		0.69		

TABLE 6 One-way ANOVA of control of learning beliefs across 4 groups.

ANOVA					
Control of learning beliefs					
	Sum of squares	df	Mean square	F	Sig.
Between groups	2.788	3	0.929	0.634	0.593
Within groups	745.986	509	1.466		
Total	748.774	512			

detrimental to one's social self-efficacy — but on mutual adaptation between the individual and the group members (İskender and Akin, 2010). Mutual adaptation requires individuals and group members to

TABLE 7 One-way ANOVA of social self-efficacy across 4 groups.

ANOVA					
Social self efficacy					
	Sum of squares	df	Mean square	F	Sig.
Between groups	7.651	3	2.550	1.392	0.244
Within groups	932.653	509	1.832		
Total	940.304	512			

TABLE 8 One-way ANOVA of academic self-efficacy across 4 groups.

ANOVA					
Academic self efficacy					
	Sum of squares	df	Mean square	F	Sig.
Between Groups	2.558	3	0.853	0.498	0.684
Within Groups	872.437	509	1.714		
Total	874.995	512			

have a high awareness of their strengths and weaknesses, understand how each member can compensate each other's weaknesses, and maximize each other's strengths to the fullest (Rupp and Becker, 2021). The better the interpersonal relationships, the higher the satisfaction with social support and social life, resulting in more persistency between the institute and workplace.

Teaching is a collaborative career in which quality of education relies on collaborative efforts with a high degree of interaction among stakeholders, including school personnel and parents. As such, student teachers should be knowledgeable about self-understanding and communication skills. Social self-efficacy is therefore an essential quality in professional teachers.

Reciprocal influence between personal self-efficacy for learning and vicarious experiences source of teaching self-efficacy

Experienced teachers with lots of practical teaching experience have seemingly adapted to the typical isolation of their work lives and have learned to base their efficacy judgments on mastery source of teaching self-efficacy. Novice teachers on the other hand, made a more explicit analysis of contextual factors, including vicarious experiences as a source of teaching self-efficacy, in judging their personal self-efficacy for learning. Vicarious experiences, assessed as the interpersonal support of administrators, colleagues, parents and members of the community, appeared to be more pertinent for novice teachers' self-efficacy beliefs. The support of colleagues and of the community made significant contributions to explaining variance in novice teachers' self-efficacy beliefs but made little contribution for career teachers. The findings in this study suggests that the sources of

TABLE 9 One-way ANOVA of vicarious source of teaching self-efficacy across 4 groups.

ANOVA				
Teaching efficacy: vicarious experience				
	Sum of squares	df	Mean square	F	Sig.
Between groups	7.717	3	2.572	2.340	0.073
Within groups	559.660	509	1.100		
Total	567.377	512			

teaching self-efficacy are weighed differently by novice and experienced teachers.

The vicarious experiences source of teaching self-efficacy originated in social contexts where different individuals have different social roles, whose behaviors exert different extents of influences on others. When contextualizing the findings within a Chinese cultural context, the influence of authority figures — such as principals, senior teachers and mentors on students' identification of self to similar others whom they learn from — should be interpreted in line with Chinese cultural values of social hierarchy (Hoi et al., 2017). Pajares and Usher (2008) called for culturally attentive research that examines human functioning in social and cultural contexts, and attends to the complex relationships between cultural background, social class, and motivation beliefs (Klassen et al., 2011). While 'culturalization of research' would enhance understanding of how cultural variations influence learning and learning behaviors, these findings call for considering cultural issues in learning from authorities and peer learning when designing teacher training programs.

The role of practicum in social-oriented self-efficacies development in pre-service teachers

Practicum is traditionally assumed to be the most powerful platform for practical skill training in real context. However, the findings suggest that practicum is less powerful than traditionally believed. Results indicated that practicum did not contribute to vicarious experiences as a source of teaching self-efficacy and personal self-efficacy for learning (academic self-efficacy, social self-efficacy, and control of learning). Novice teachers who do not have rich teaching experience rely heavily on vicarious instead of mastery experiences as a source of teaching self-efficacy. As such, they will not benefit from practicum that does not purposely consider and maximize the power of vicarious experiences as a source of teaching self-efficacy, and is treated as merely a separated and unrelated learning context to academic training.

Implications

Enhancing perceived control of learning and social self-efficacy in promoting academic self-efficacy

Non-academic self-efficacy has been traditionally placed in a lower priority than academic self-efficacy in facilitating academic achievement. The findings revealed that perceived external control of learning and social self-efficacy could exert influential power in one's academic learning self-efficacy. Teacher training program should put equal weight in social–emotional training and academic training to strengthen teachers' resilience-related skills, including context analysis and perspective taking. These would help them re-frame the difficulties that they face by taking different perspectives, allowing them to explore more alternatives and obtain higher perceived control of the learning situation. Successful learning can be maximized if an individual is capable of controlling their emotions and reactions to the unexpected and associated negative thoughts. This would enhance their likelihood of identifying alternatives and opportunities to resolve or improve the less desirable situations that affect their own learning (Schwarzer, 2014). Enhancing perceived control of learning in a dynamic context is therefore critical to successful learning in an interactive environment (Won et al., 2017).

Promoting vicarious experiences as a source of teaching self-efficacy in practicum

Teachers' judgment of their capacity to impact students' learning outcomes has been consistently related to teacher behavior and beliefs in self-competence, in both working and learning contexts. Conducive factors that promote and sustain the formulation of competency become critical conditions for quality teaching and learning. This study demonstrated that novice teachers who have fewer mastery experiences than their experienced counterparts are more impacted by vicarious experiences as a source of teaching self-efficacy. Considering the critical role of social hierarchy in Chinese culture, the behavior demonstrated by authority figures in particular, such as senior teachers and principals, should exert greater influence in pre-service teachers' learning and development. It follows that any responses, whether positive or negative, from these authority figures could impact these teachers' learning and development powerfully (Hoi et al., 2017). Hence, teacher training curriculum design should consider the sensitivity of inexperienced teachers to contextual factors such as organizational climate, collaborative style amongst novice and experienced colleagues, available support, and interpretation of these support from perceived authority figures in a Chinese cultural context.

Functional role of practicum

Working at schools is a collaborative context that requires social skills in addition to merely teaching skills. Practicum should be considered as a part of the teacher training curriculum which offers and requires sensitive training in both teaching and social skills. To facilitate the transfer of learning from practicum to academia, teacher training curriculum designers should offer learning activities within academia that highly resemble the collaborative nature of tasks at workplaces.

Limitations

Despite the contributions of the present study in relating personal self-efficacy for learning and vicarious experiences as a source of

teaching self-efficacy in pre-service teacher training, there are a number of limitations which need to be addressed in future studies.

First, the self-reported measures used in this study were adopted from existing inventories which were developed from non-Asian populations. Although the measures seemed to be applicable to the present Asian sample, Chinese cultural values and beliefs on self-evaluation, such as the virtue of being humble and respecting authorities, have not been considered in this study. Hence, a variety of materials and program characteristics need to be examined for generalizability. Although the current findings may not be generalizable to other teacher training programs, the findings are primarily useful and important to early childhood educators, and perhaps also to the wider teaching community that share similar concerns.

Second, the majority of the participants were female, aged 18 to 22 years old. We are unable to conclude that the same findings can be applied to male teachers, or those in other age groups who may have richer sources of self-efficacy.

Third, the current study used a cross-sectional design, which means results can only be considered as a snapshot in one period of time (Turner et al., 2014). There could well be differences across cohorts that are not reflected in these results, which could be identified in a longitudinal study. Future studies could include qualitative data to tap the underlying issues regarding pre-service teachers' needs, challenges, and beliefs about teacher efficacy throughout the training years.

Fourth, longitudinal designs that would allow researchers to observe the periods of flux and stability of self-efficacy beliefs at different career stages (pre-service, novice, early, mid-, and late career) would be of value, and some are appearing (Hoy and Spero, 2005). Attention to the development of teacher efficacy attributed to different sources of teaching self-efficacy over the career span and in late career stages is largely absent in the current research (Klassen et al., 2011).

Conclusion

Development of different domains of self-efficacy is not only affected by different sources of teaching self-efficacy, but also vary between pre-service and experienced teachers. This study renewed the existing understanding on the reciprocal influences of personal self-efficacy for learning and vicarious experiences as a source of teaching efficacy, which can be fostered by teacher education programs. Future

study will be required to explore the culturalization of sources of teaching self-efficacy, how different components of personal self-efficacy for learning change over career stages and time, and how the transfer of learning between practicum and academia can be further enhanced.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Hong Kong Metropolitan University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Anderson, S. L., and Betz, N. E. (2001). Sources of social self-efficacy expectations: their measurement and relation to career development. *J. Vocat. Behav.* 58, 98–117. doi: 10.1006/jvbe.2000.1753

Bandura, A. (1986). Fearful expectations and avoidant actions as coeffects of perceived self-inefficacy. *Am. Psychol.* 41, 1389–1391. doi: 10.1037/0003-066X.41.12.1389

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educ. Psychol.* 28, 117–148. doi: 10.1207/s15326985ep2802_3

Bandura, Albert. (1997). *Self-Efficacy: The Exercise of Control*. New York: W.H. Freeman.

Bandura, A. (2005). "Guide for constructing self-efficacy scales" in *Self-Efficacy Beliefs of Adolescents*. eds. F. Pajares and T. Urdan (North Carolina: Information Age Publishing), 307–337.

Browne, M. W., and Cudeck, R. (1993). Alternative ways of assessing model fit. *Testing structural equation models* eds. K. A. Bollen and J. S. Long (Newbury Park, CA: Sage) 136–162.

Caprara, G. V., Barbaranelli, C., Steca, P., and Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: a study at the school level. *J. Sch. Psychol.* 44, 473–490. doi: 10.1016/j.jsp.2006.09.001

Cascio, M. I., Magnano, P., Elastico, S., Costantino, V., Zapparrata, V., and Battiato, A. (2014). The relationship among self-efficacy beliefs, external locus of control and work stress in public setting schoolteachers. *Open J. Soc. Sci.* 2, 149–156. doi: 10.4236/jss.2014.211021

Chen, E. S. L., and Rao, N. (2011). Gender Socialization in Chinese Kindergartens: Teachers' Contributions. *Sex Roles* 64, 103–116. doi: 10.1007/s11199-010-9873-4

de Mesquita, Carvolho, Marcos, Jose, and Kostelijk, Erik. (2021). "Exploratory factor analysis (EFA)." In *Marketing Analytics: Statistical Tools for Marketing and Consumer Behavior Using SPSS*, edited by MesquitaJose Marcos Carvolho de and Erik Kostelijk, Routledge 131–151.

Drago, A., Rheinheimer, D. C., and Detweiler, T. N. (2018). Effects of locus of control, academic self-efficacy, and tutoring on academic performance. *J. Coll. Stud. Ret.* 19, 433–451. doi: 10.1177/1521025116645602

Fida, R., Paciello, M., Tramontano, C., Barbaranelli, C., and Farnese, M. L. (2015). "Yes, I can": the protective role of personal self-efficacy in hindering counterproductive work behavior under stressful conditions. *Anxiety Stress Coping* 28, 479–499. doi: 10.1080/10615806.2014.969718

Field, Andy. (2013). *Discovering Statistics Using IBM SPSS Statistics*. *4th*. Los Angeles: Sage.

Gist, M. E., and Mitchell, T. R. (1992). Self-efficacy: a theoretical analysis of its determinants and malleability. *Acad. Manag. Rev.* 17, 183–211. doi: 10.2307/258770

Gloudemans, H., Schalk, R., Reynaert, W., and Braeken, J. (2012). The development and validation of a five-factor model of sources of self-efficacy in clinical nursing education. *J. Nurs. Educ. Pract.* 3:80. doi: 10.5430/jnep.v3n3p80

Hoi, C. K., Weng, M. Z., Teo, T., and Nie, Y. (2017). Measuring efficacy sources: development and validation of the sources of teacher efficacy questionnaire (Steq) for Chinese teachers. *Psychol. Sch.* 54, 756–769. doi: 10.1002/pits.22025

Hoy, A. W., and Spero, R. B. (2005). Changes in teacher efficacy during the early years of teaching: a comparison of four measures. *Teach. Teach. Educ.* 21, 343–356. doi: 10.1016/j.tate.2005.01.007

Huong, V. T., Mai, N. T., Tung, T., Hong, T. T. M., and Hung, D. H. (2020). Partnerships between teacher education universities and schools in practicum to train pre-service teachers of Vietnam. *Int. J. High. Educ.* 9:134. doi: 10.5430/ijhe.v9n5p134

İskender, M., and Akin, A. (2010). Social self-efficacy, academic locus of control, and internet addiction. *Comput. Educ.* 54, 1101–1106. doi: 10.1016/j.compedu.2009.10.014

Jex, S. M., and Bliese, P. D. (1999). Efficacy beliefs as a moderator of the impact of work-related stressors: a multilevel study. *J. Appl. Psychol.* 84, 349–361. doi: 10.1037/0021-9010.84.3.349

Jöreskog, Karl, and Sörbom, Dag. (2006). *LISREL 8.80*. Chicago, IL: Scientific Software International, Inc.

Kieffer, Kevin M, and Henson, Robin K. (2000). "Development and Validation of the Sources of Self-Efficacy Inventory (SOSI): Exploring a New Measure of Teacher Efficacy." Paper Presented at the Annual Meeting of the National Council on Measurement in Education, New Orleans, April 25–27.

Klassen, R. M., Tze, V. M. C., Betts, S. M., and Gordon, K. A. (2011). Teacher efficacy research 1998–2009: signs of Progress or unfulfilled promise? *Educ. Psychol. Rev.* 23, 21–43. doi: 10.1007/s10648-010-9141-8

Klassen, R. M., Usher, E. L., and Bong, M. (2010). Teachers' collective efficacy, job satisfaction, and job stress in cross-cultural context. *J. Exp. Educ.* 78, 464–486. doi: 10.1080/00220970903292975

Lent, R. W., Ireland, G. W., Penn, L. T., Morris, T. R., and Sappington, R. (2017). Sources of self-efficacy and outcome expectations for career exploration and decision-making: a test of the social cognitive model of career self-management. *J. Vocat. Behav.* 99, 107–117. doi: 10.1016/j.jvb.2017.01.002

Marsh, H. W., Pekrun, R., Kou Murayama, A., Arens, K., Parker, P. D., Guo, J., et al. (2018). An integrated model of academic self-concept development. Academic self-concept, grades, test scores, and tracking over 6 years. *Dev. Psychol.* 54, 263–280. doi: 10.1037/dev0000393

McLennan, B., McIlveen, P., and Perera, H. N. (2017). Pre-service teachers' self-efficacy mediates the relationship between career adaptability and career optimism. *Teach. Teach. Educ.* 63, 176–185. doi: 10.1016/j.tate.2016.12.022

Ozer, E. M., and Bandura, A. (1990). Mechanisms governing empowerment effects: a self-efficacy analysis. *J. Pers. Soc. Psychol.* 58, 472–486. doi: 10.1037/0022-3514.58.3.472

Pajares, F. M., and Usher, E. L. (2008). Self-efficacy, motivation, and achievement in school from the perspective of reciprocal determinism. *Adv. Motiv. Achiev.* 15, 391–423. doi: 10.1016/S0749-7423(08)15012-9

Peres-Neto, P., Jackson, D. A., and Somers, K. M. (2005). How many principal components? Stopping rules for determining the number of non-trivial axes revisited. *Comput Stat Data Anal* 49, 974–997. doi: 10.1016/j.csda.2004.06.015

Pintrich, Paul R., Smith, D., García, T., and McKeachie, W (1991). *A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. Ann Arbor, Michigan: National Centre for Research to Improve Post-secondary Teaching and Learning.

Richardson, P. W., and Watt, H. M. G. (2018). "Teacher professional identity and career motivation: a lifespan perspective" in *Research on Teacher Identity: Mapping Challenges and Innovations*. eds. P. A. Schutz, J. Hong and D. C. Francis (Cham, Switzerland: Springer), 37–48.

Robbins, J. M., and Krueger, J. I. (2005). Social projection to ingroups and outgroups: a review and meta-analysis. *Personal. Soc. Psychol. Rev.* 9, 32–47. doi: 10.1207/s15327957pspr0901_3

Rupp, D., and Becker, E. S. (2021). Situational fluctuations in student teachers' self-efficacy and its relation to perceived teaching experiences and cooperating teachers' discourse elements during the teaching practicum. *Teach. Teach. Educ.* 99:103252. doi: 10.1016/j.tate.2020.103252

Schunk, D. H., and Pajares, F. (2002). "Chapter 1 - the development of academic self-efficacy" in *Development of Achievement Motivation*. eds. A. Wigfield and J. S. Eccles (San Diego, CA: Academic Press), 15–31.

Schwarzer, Ralf, ed. (2014). *Self-Efficacy: Thought Control of Action*. New York: Taylor & Francis.

Stipanovic, N., Stringfield, S., and Witherell, E. (2017). The influence of a career pathways model and career Counseling on students' career and academic self-efficacy. *Peabody J. Educ.* 92, 209–221. doi: 10.1080/0161956X.2017.1302217

Tschannen-Moran, M., and Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teach. Teach. Educ.* 23, 944–956. doi: 10.1016/j.tate.2006.05.003

Turner, Lisa A., Christensen, Larry B, and Johnson, Burke. (2014). *Research Methods, Design and Analysis*. Boston: Pearson.

Won, S., Lee, S.-Y., and Bong, M. (2017). Social persuasions by teachers as a source of student self-efficacy: the moderating role of perceived teacher credibility. *Psychol. Sch.* 54, 532–547. doi: 10.1002/pits.22009

Yim, E. P. Y. (2015). "In the minority yet finding a voice: the value of using narrative inquiry in exploring parent education programs in Hong Kong" in *Using Narrative Inquiry for Educational Research in the Asia Pacific*. eds. S. Trahar and Y. Wai Ming (Singapore: Routledge), 163–176.

Zhen, R., Liu, R.-D., Ding, Y., Wang, J., Liu, Y., and Le, X. (2017). The mediating roles of academic self-efficacy and academic emotions in the relation between basic psychological needs satisfaction and learning engagement among Chinese adolescent students. *Learn. Individ. Differ.* 54, 210–216. doi: 10.1016/j.lindif.2017.01.017

Zimmerman, B. J. (1995). "Self-efficacy and educational development" in *Self-Efficacy in Changing Societies*. ed. A. Bandura (New York, NY: Cambridge University Press), 202–231.