Zhou: Collective Teacher Efficacy: An Introduction to Its Theoretical Constructs, Impact, and Formation
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Collective Teacher Efficacy: An Introduction to Its Theoretical Constructs, Impact, and Formation

Abstract: *Collective teacher efficacy has been introduced as the number one impact on students' achievement by John Hattie and has drawn increasing attention from educational researchers. This study presents the theoretical background of collective teacher efficacy and some empirical findings of this new number one visible learning factor. The paper also explores current results and discussions around the sources and formation of collective efficacy. At last, the author provides implications in where further research is needed, including theoretical construction, empirical studies from an organizational perspective, and cross-culture comparative.*
Keywords: *Collective Teacher Efficacy, Theoretical Background, Empirical Studies*

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摘要 (YaRu Zhou: 集体教师效能：理论建构，影响以及形成的一项简介): John Hattie将集体教师的效能作为对学生成绩的首要影响，并引起了教育研究者越来越多的关注。这项研究提供了集体教师效能的理论背景，以及这一新的第一可见的学习因素的一些实验性的发现。本文还探讨了当前的一些结果，以及围绕集体功效的来源和形成而进行的一些讨论。最后，作者在需要进一步研究的地方提出了一些建议，包括理论构建，从组织角度出发的实证研究以及跨文化比较。
关键词：集体教师效能，理论背景，实证研究

摘要(YaRu Zhou: 集體教師效能：理論建構，影響以及形成的一項簡介)：John Hattie將集體教師的效能作為對學生成績的首要影響，並引起了教育研究者越來越多的關注。這項研究提供了集體教師效能的理論背景，以及這一新的第一可見的學習因素的一些實驗性的發現。本文還探討了當前的一些結果，以及圍繞集體功效的來源和形成而進行的一些討論。最後，作者在需要進一步研究的地方提出了一些建議，包括理論構建，從組織角度出發的實證研究以及跨文化比較。
關鍵詞：集體教師效能，理論背景，實證研究

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Zusammenfassung *(YaRu Zhou: Kollektive Effizienz der Lehrenden: Eine Einführung in theoretische Konstrukte, Auswirkungen und Formierungen): Die kollektive Wirksamkeit von Lehrenden wurde von John Hattie als wichtigste Auswirkung auf die Leistung der Schüler eingeführt und hat die Aufmerksamkeit der Bildungsforscher auf sich gezogen. Diese Studie stellt den theoretischen Hintergrund der kollektiven Wirksamkeit der Lehrkräfte und einige empirische Erkenntnisse über diesen neuen sichtbaren Lernfaktor Nummer eins vor. Das Papier untersucht auch aktuelle Ergebnisse und Diskussionen über die Quellen und die Bildung kollektiver Wirksamkeit. Schließlich gibt die Autorin Hinweise darauf, wo weiterer Forschungsbedarf besteht, einschließlich theoretischer Konstruktionen, empirischer Studien aus organisatorischer Sicht und im interkulturellen Vergleich.*
Schlüsselwörter: *Kollektive Lehrereffizienz, theoretischer Hintergrund, empirische Studien*

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Аннотация (Я-Ру Джоу: Коллективная эффективность учителей: теоретический аспект, последействие и перспективы): Термин «коллективная эффективность учителей» был введен Джоном Хэтти; рассматривалась эта модель обучения как важнейший фактор, влияющий на его результат; данная концепция сразу привлекла к себе внимание ученых, занимающихся изучением образовательного дискурса. В данной статье рассматриваются теоретические предпосылки

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возникновения концепции коллективной эффективности учителей; представлены также результаты эмпирических исследований, направленных на выявление роли этого нового обучающего фактора. Анализируются актуальные данные и научные дискуссии относительно источников «производства» коллективной эффективности. В заключительной части работы автор указывает на перспективы дальнейшего исследования данной проблематики, охватывая теоретические направления, эмпирические исследования через т. н. «организаторскую» перспективу, а также сопоставительный анализ в контексте диалога культур.

Ключевые слова: *коллективная эффективность учителей, теоретические предпосылки, эмпирические исследования*

Positive consequences of Collective Teacher Efficacy

"Collective teacher efficacy is the perceptions of teachers in a school that the efforts of the faculty as a whole will have a positive effect on students" (Goddard, Hoy, & Hoy, 2000, p. 480). At the Collaborative Impact Conference 2017, the author of Visible Learning, John Hattie, and his team presented collective teacher efficacy as the "new number one influenced" on student achievement, with an outstanding effect size of $d = 1.57$ (Waack, 2018). Hattie's conclusion is based on Rachel Jean Eells' Meta-Analysis of the Relationship Between Collective Teacher Efficacy and Student Achievement (2011). Even though collective teacher efficacy is a relatively new topic in the educational research field, it has been drawing considerable attention from researchers due to increasing positive and significant empirical research findings.

In 2001, Goddard published his findings of a significantly positive correlation between collective efficacy and between-school differences in student achievement in "Collective Efficacy: A Neglected Construct in the Study of Schools and Student Achievement." The study tried to "test the relation between collective efficacy and student achievement using longitudinal data that provided a control for students' past achievement" (p. 467). The research involved 47 elementary schools from one large urban Midwestern school district. A total of 452 K-G5 teachers completed the collective efficacy survey, which is a 21 Likert-type items scaled from 1 (strongly disagree) to 6 (strongly agree). Student personal data, e.g. gender, race, SES, and longitudinal student achievement data were provided by the school district. The results showed that, in the full multilevel model, 26.6% of the variance in students' mathematics achievement and 19.5% of reading achievement occurred between schools were explained by collective efficacy (Goddard, 2001, p 473).

Tschannen-Moran & Barr (2004) examined 66 middle schools in the Commonwealth of Virginia investigating the relation between students' learning outcomes and collective teacher efficacy independent of SES. The Collective Teacher Belief Scale was used to measure the construct of collective teacher efficacy. Students' achievement in math, writing, and reading/literature/research were measured by the Virginia Standards of Learning (SOL) Tests. Significant positive relationships were revealed between teacher perceived collective efficacy and student achievement in eighth-grade math ($r = .41$, $p < .01$), writing ($r = .50$, $p < .01$), and English ($r = .37$, $p < .01$). The findings also showed that collective teacher efficacy made an independent contribution to explaining the variance in student achievement in writing independent of SES, but not in Math or English, which might due to the strong correlation with SES ($r = .81$, $p < .01$) that "leave little systematic variance for collective teacher efficacy to explain" (p. 204).

In the empirical research published in 2004, Goddard and his colleagues collected data from 96 high schools in a large midwestern state to examine the correlation between collective teacher efficacy and the learning outcomes of students in grade twelve. "Averaged across content areas, the results suggest that a 1-SD increase in collective efficacy is associated with a gain of about 0.25 SD in terms of the num-

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ber of students who pass high-stakes assessments in 12th grade" (Goddard, Logerfo, & Hoy, 2004, p. 420).

Eells (2011) analyzed twenty-six studies published from 1994 to 2010 investigating collective teacher efficacy in her meta-analysis. All twenty-six studies reported Pearson Product-moment correlation between collective teacher efficacy and student achievement. Many of them studied focused on the correlation, some of them also analyzed other variables, a few only reported Pearson's *r* as Descriptives. Sixteen of these studies were conducted at the elementary school level, two at the middle school level, and six in high schools. Two studies included all grade levels. All schools that participated were public schools, except a Nigeria study which involved both public and private schools. In all twenty-six studies, collective teacher efficacy was measured by self-report Likert scale surveys. The measurement of achievement, in all cases, was state-mandated standardized assessments that obtained from the education department.

Eells concluded that "the meta-analyses conducted for this sample demonstrate a strong positive effect size for the relationship between CTE and achievement. As collective teacher efficacy increases in a school, so does achievement. This holds true for all subject areas measured, and regardless of timing of measurement (p. 109). The effect sizes for this relationship varied from 0.537 to 0.628. The largest effect size was found for CTE and reading achievement and the lowest was for CTE and social studies achievement" (p. 111).

Ramos et al.'s literature review (2014) came to a similar conclusion. Ramos and colleagues reviewed thirty English and Portuguese articles about collective teacher efficacy published between 2000 and 2013. Twelve of the articles aimed to examine the correlation between collective teacher efficacy and students' performance, and all twelve studies found a positive correlation between them.

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Improvement of students' performance is not the only fruit a team with high collective teacher efficacy can bear. Empirical research has found a number of productive behaviors associated with collective efficacy, including more in-depth implementation of school improvement plans, increased teacher leadership, receptiveness to new ideas, and a greater sense of efficacy to parents. In addition, teachers who perceive a strong sense of collective efficacy exhibit a positive attitude toward professional development, higher job satisfaction, and commitment to the teaching profession, less stress or burnout. They are more willing to take risks and to overcome challenges to meet students' needs. Studies also revealed that, in schools with high collective efficacy, students were more likely to be engaged emotionally, and fewer students were excluded due to behavior issues. Finally, collective teacher efficacy is positively related to teacher self-efficacy (Donohoo, 2018).

The positive findings of empirical research are overwhelming, but what is collective teacher efficacy? More importantly, how to create and maintain teachers' collective efficacy? These questions are addressed in the following sessions.

Theoretical Background

The concept of collective efficacy was introduced by Bandura in the 1990s as "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (1997, p. 477), which is rooted deeply in Bandura's social cognitive theory and his concept of self-efficacy.

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Social cognitive theory

Social cognitive theory believes that people are capable agentic operators who exercise influence over what they do and contribute to what happens to them. The human agency operates within an interdependent causal structure involving triadic reciprocal causation shown in Figure 1 below (Bandura, 1986a).
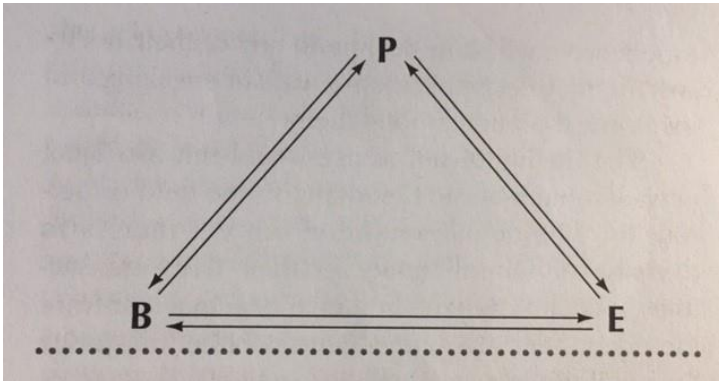

Figure 1. The relationship between the three major classes of determinants in triadic reciprocal causation.

B stands for behavior; P the internal personal factors in the form of cognitive, affective, and biological events; and E the external environment. (Bandura, 1986) Although, the interaction and influence of these three major classes of determinants vary for different activities, under different circumstances, and at different paces, they have a crucial impact on what we believe about ourselves, the choices we make and the actions we take.

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Self-efficacy and collective efficacy

Self-efficacy is the core concept of Bandura's social cognitive theory. In his book, Self-Efficacy: The Exercise of Control, he defined it as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Efficacy expectations are distinctive from response-outcome expectations (Bandura, 1977, p.193). Perceived self-efficacy influences behavior choices. People try to avoid dangerous activities and conditions which they believe exceed their capacity and participate assuredly in the ones of which they believe they are capable. Perceived self-efficacy also determines the coping efforts, how much effort to put in and how long to persist, when people encounter difficulties and intimidating situations. People's thought patterns and emotional reactions are also influenced by perceived self-efficacy (Bandura, 1986, p.393, 394). Bandura pointed out that "psychological theories postulating that expectations influence actions focused almost exclusively on outcome expectations (1997, P. 19). Outcome expectations, which can provide incentives and disincentives for a given behavior, depend highly on people's judgement of how well they will be able to perform in a given task. The relationship between efficacy expectations and outcome expectations is illustrated in Figure 2 (Bandura, 1986, 1997).

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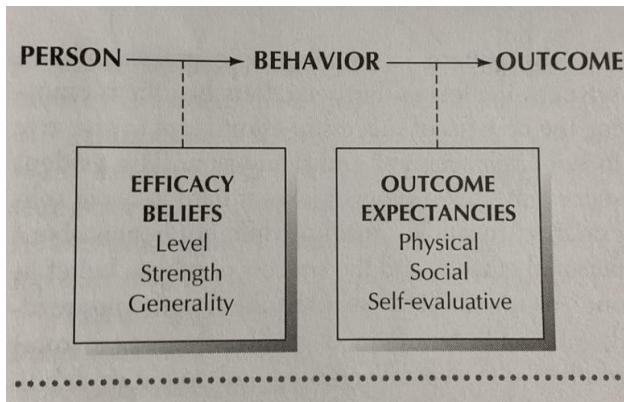International Dialogues on Education, 2019, Volume 6, Number 2, pp. 69-82
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Figure 2. The conditional relationships between efficacy beliefs and outcome expectancies. In given domains of functioning, efficacy beliefs vary in level, strength, and generality. The outcomes that flow from a given course of action can take the form of positive or negative physical, social, and self-evaluation effects (Bandura, 1997, p. 22)

People do not live in isolation but depend on each other to produce certain desired results. The growing interdependence of modern society underlines the pressing need to study collective action designed to shape the course of events. Therefore, besides individual self-efficacy, Bandura also presented collective efficacy which is the group members' shared beliefs in the group's operative capabilities. Bandura believes that the interactive and dynamics of the members produce the functioning of an organization. Therefore, collective efficacy is more than the sum of the individual attributes (Bandura, 1997).

Bandura postulated four sources of self-efficacy: enactive mastery experience, vicarious experience, verbal persuasion, and physiological and affective states. Enactive mastery is the most powerful since it is based on personal mastery experiences. Successful performances raise efficacy beliefs whereas repeated failures lower them. However, the effect of failure will reduce if it occurs after strong efficacy expectations developed through repeated success. Vicarious experiences happen when people observe others modeling the skill in question. Its effects on self-efficacy depend on the degree to which the observer identifies with the model; close identification leads to a substantial impact on efficacy and vice versa. Social persuasion is widely used for its availability but providing social persuasion alone may have limited influence on self-efficacy. However, if people are persuaded to take actions or work harder on the given task, this social persuasion experience can contribute to successful performances that create enduring increases in self-efficacy. Modifications of physiological and affective states, such as enhanced physical states, reduced stress levels, and negative emotional proclivities, and so on, is the fourth significant way of altering efficacy beliefs (Bandura, 1977, 1997).

Teacher efficacy

Teacher efficacy is "teachers' belief or conviction that they can influence how well students learn, even those who may be difficult or unmotivated" (Guskey & Passaro, 1994, p.4). Bandura identified teacher efficacy as a type of self-efficacy. However, there is another conceptual strand for teacher efficacy.

Teacher efficacy was first defined by RAND researchers as "the extent to which the teacher believes he or she can affect student performance" (McLaughlin & Marsh, 1978, p. 84). In 1976, RAND researchers put two items in a questionnaire for a study examining the efficiency of certain reading interventions

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and programs and found that "teacher efficacy, determined by summing scores on the two items listed below, was strongly related to variations in reading achievement among minority students" (Tschannen-Moran, 1998, p. 204). RAND Item I: "When it comes right down to it, a teacher really can't do much because most of a student's motivation and performance depends on his or her home environment." RAND Item II: "If I really try hard, I can get through to even the most difficult or unmotivated students." Since Item I measures beyond individual capabilities of a particular teacher, later it was labeled as General Teaching Efficacy (GTE), and Item II was labeled as Personal Teaching Efficacy (PTE) because it is more specific and individual (Tschannen-Moran, 1998).

RAND researchers stated that the two items were inspired by Rotter's paper Generalized Expectation for Internal versus External Control of Reinforcement (1966). The key theory of this paper is called locus of control. Rotter proposed that the control of reinforcement lays either in the internal factors, such as a person's behaviors, or external environment factors. Students' achievement and motivation have been considered as an essential reinforcement for teachers' behaviors. According to the locus of control, "teachers who believe that they could influence student achievement and motivation assume that they could control the reinforcement of their actions, thus have higher efficacy" (Goddard, Hoy & Hoy, 2000, p. 481).

The two different but interweaving conceptual strands have caused considerable confusion, and a lack of clarity of conceptualization adverse to theory construction and jeopardizes the reliability of the instruments, which will be further addressed in the later section of this paper.

Two Dimensions

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Two dimensions or factors have consistently appeared in factor analyses of the scales commonly used in the measurement of teacher self-efficacy regardless of the concept roots. There is a consensus on the first dimension, commonly called Personal Teaching Efficacy. However, there has been disagreement and debates arisen regarding the meaning of the second dimension, which is often called General Teaching Efficacy. Some researchers believe that it should be called "external influence" which represents Rotter's construct of external control, while others argue that it is an outcome expectancy, the second element of Bandura's self-efficacy theory (Tschannen-Moran, Hoy & Hoy, 1998).

Gibson and Dembo (1984) tried to apply Bandura's two-component model of self-efficacy to define the two factors of teacher efficacy: "outcome expectancy would essentially reflect the degree to which teachers believed the environment could be controlled (General Teaching Efficacy, GTE), that is, the extent to which students can be taught given such factors as family background, IQ, and school conditions. Self-efficacy beliefs would indicate teachers' evaluation of their abilities to bring about positive student change (Personal Teaching Efficacy, PTE)" (p. 570).

However, in 1994 Guskey & Passaro conducted a study to "examine the structure of a construct generally labeled teacher efficacy" (p.627), which was measured using an altered form of the Gibson & Dembo Teacher Efficacy Scale from 342 prospective and experienced teachers, and revealed that "teachers' perceptions of their personal influence on student learning are not solely based on, nor strongly related to, their perceptions of the influence of external environmental conditions. The personal versus teaching efficacy distinction does not appear to hold" (p. 639,640).

On the foundation of previous research, Tschannen-Moran, Woolfolk Hoy, & Hoy proposed an Integrated Model in their paper, Teacher Efficacy: Its Meaning and Measure in 1998. This model interweaved

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the major theoretical influences on teacher efficacy research and suggested new areas for research (see Figure 3).
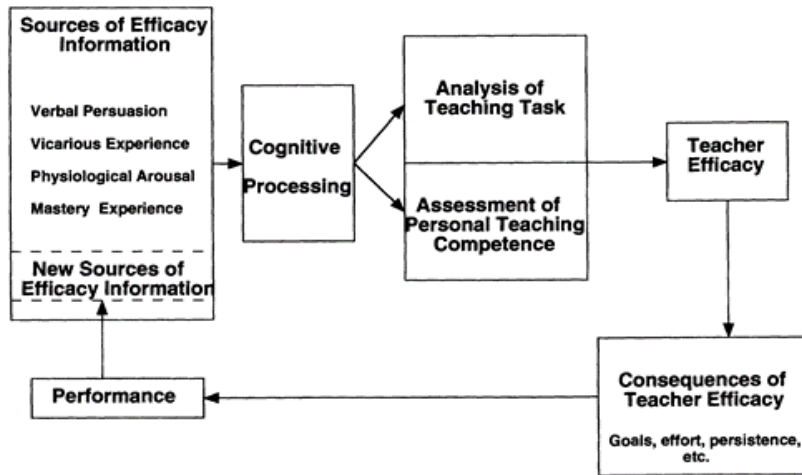

Figure 3. The cyclical nature of teacher efficacy (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998)

Tschannen-Moran, Woolfolk Hoy, & Hoy (1998) agreed that the attributional analysis and interpretation of Bandura's four sources of information are the main influences on teacher efficacy. Meanwhile, they argued that analyzing the teaching task and its context is necessary when making judgments of one's strengths and weakness since teacher efficacy is context specific. Teachers may feel competent teaching a particular subject than the other or teaching some students than the others.

According to Tschanne-Moran, two dimensions in this model are related to (but not identical with) the two factors, GTE and PTE. "In analyzing the teaching task and its context, the relative importance of factors that make teaching difficult or act as constraints is weighed against an assessment of the resources available that facilitate learning. In assessing self-perceptions of teaching competence, the teacher evaluates personal capabilities such as skills, knowledge, strategies, or personality traits balanced against personal weaknesses or liabilities in this particular teaching context." (p. 228).

Collective teacher efficacy and a model of its formation, influence, and change

Collective teacher efficacy is an extension of individual teacher efficacy (Tschannen-Moran, Hoy, & Hoy, 1998). Goddard and his colleagues defined it as "the perception of teachers in a school that the efforts of the faulty as a whole will have a positive effect on students" (2000, p. 503).

Bandura believed that "perceived personal and collective efficacy differ in the unit of the agency, but in both forms, efficacy beliefs have similar sources, serve similar functions, and operate through similar processes" (1997, p. 478). Developed from this notion, Goddard, Hoy & Hoy (2000) extended self-efficacy theory to the collective level by applying the assumptions of social cognitive theory to the or-

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ganization level (p. 483) and build a model of collective teacher efficacy based on Tschannen-Moran et al.' Integrated Model of Teacher Efficacy (see Figure 4).
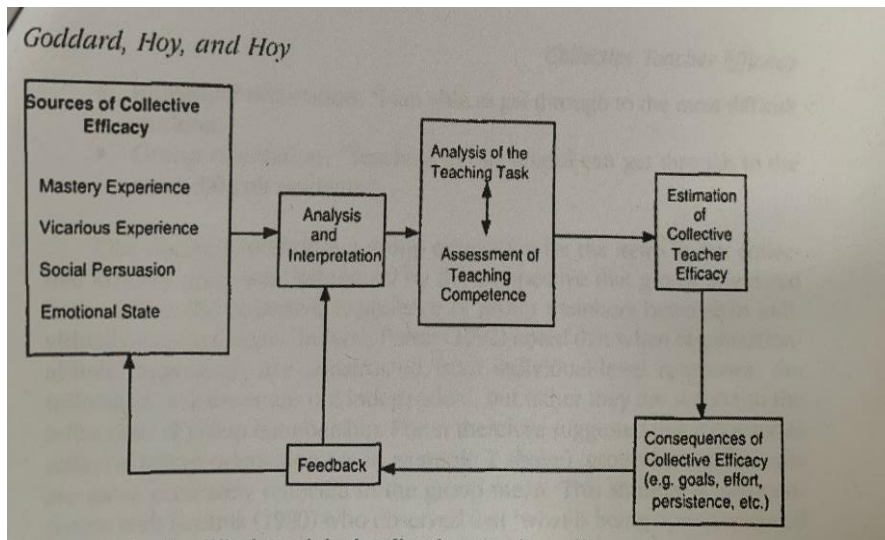

Figure 4. A simplified model of collective teacher efficacy (Goddard, Hoy, & Hoy, 2000)

Goddard and his colleagues postulate that Bandura's four sources of self-efficacy -mastery experience, vicarious experience, social persuasion, and emotional arousal - are also fundamental for forming collective teacher efficacy (2000).

Mastery Experience

Mastery experience is considered the most important source in forming collective efficacy (Bandura, 1997; Goddard, 2004). A critical mass of studies demonstrates the positive effect of experience on organization performance (Huber, 1991). Schools as an organization learn from their direct experience. Past successes of the school enhance the team's perceived collective efficacy, whereas failures tend to lower beliefs. Attributions are also a key element. For example, when success is attributed to the team's ability or effort, collective efficacy is strengthened, and if the failure is attributed to bad luck or the uncontrollable causes, the perceived collective efficacy may not be undermined. However, if successes are often and too easy, failure is more likely to produce discouragement (Goddard, Hoy & Hoy, 2004). Goddard et al believed that "a resilient sense of collective efficacy probably requires experience in overcoming difficulties through persistent effort" (2000, p. 484).

Goddard (2001) studied 47 elementary schools within one large urban midwestern school district, involving 452 teachers and 2,536 students. The findings show that mastery experience, which explained 80% of the variability in the study, is a significant positive predictor of differences among schools in collective efficacy. Moreover, "when mastery experience was considered, school-level SES and race were no longer statistically significant predictors of differences among schools in collective efficacy" (p. 474).

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Vicarious Experience

According to Huber, "organizations commonly attempt to learn about the strategies, administrative practices, and especially technologies of other organization" (1991, p. 96). It is not uncommon for schools to replicate successful educational programs or borrowing from other schools aiming to achieve similar success. Collective teacher efficacy may also be strengthened by learning from successful schools, particularly the ones sharing similar organization goals and/or facing similar opportunities and challenges. However, it is prudent to point out that the research on how organizations learn from vicarious experience has not been sufficiently developed. To better understand the impact of observational learning on collective efficacy, more studies are needed.

Social Persuasion

Social persuasion is another approach of strengthening faculty's beliefs that they have the capability to accomplish the goals established. Staff meetings, professional development opportunities, workshops, and talks in teachers' lounge could all serve to inspire actions. Though acting alone, social persuasion may not generate profound organizational changes, combined with positive direct or vicarious experience, it is likely to serve as a powerful influence on shaping a group's collective beliefs. Social persuasion is a means of conceiving ongoing organizational socialization. Organizations are filled with social exchanges that communicate expectations, rewards, and sanctions. New teachers in schools with high collective beliefs quickly learn the high expectation for collective actions and performances from intercourses with other teachers and administrators. Collective teacher efficacy as an essential aspect of the organizational socialization and school culture creates a normative press that encourages the team to pursue excellence and overcome challenging obstacles (Goddard, Hoy & Hoy, 2000; 2004).

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Affective States

Just as individual efficacy is susceptible to anxiety or excitement, organizations react to stress also. According to Goddard et al, "affective states may influence how organizations interpret and react to the myriad challenges they face" (2004, p.6). Schools, possessed by a strong belief in group capability, intend to rise to the challenge and have a high tolerance to pressure and crises. In contrast, less efficacious schools tend to overreact or react dysfunctionally when confronted with disruptive forces.

It is important to notice that, though the theory is plausible, there is little research on how social persuasion or affective states impact collective efficacy beliefs and group performances. More research, especially empirical studies, are needed in this area.

While as all four sources of information are critical in conceiving collective efficacy, cognitive processing and interpretation of the information are also pivotal. Bandura pointed out that "changes in perceived efficacy result from cognitive processing of the diagnostic information that performances convey about capability rather than the performances per se" (1997, p. 81).

Analysis of the teaching task

Goddard, Hoy, & Hoy call the process of teachers assessing what will be required as they engage in teaching as the analysis of the teaching task. "Factors that characterize the task include the abilities and motivations of students, the availability of instructional materials, the presence of community resources and constraints, and the appropriateness of the school's physical facilities" (2000, p. 485). In a

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word, teachers analyze what contribute to successful teaching, the challenges and barriers faced, and resources available to overcome the limitations and achieve excellence.

Assessment of teaching competence

Teachers analyze the team's teaching competency, including teaching skills, methods, training, and expertise, in conjunction with their examination of the teaching task. "Judgements of teaching competence might also include positive faculty beliefs in the ability of all children in their school to succeed" (Goddard, Hoy, & Hoy, 2000, p. 485).

Formation of collective teacher efficacy at schools

The Goddard, Hoy, & Hoy's model of Collective Teacher Efficacy was commonly accepted by the field. However, there are still many questions to be answered regarding how collective teacher efficacy is formed at schools. Goddard and his colleagues proposed that to foster collective efficacy, schools need to provide "practices that enable group members to exert influence and exercise organizational agency" (p.10). For example, they found that "after adjusting for school context, a .41 standard deviation increase in the extent to which teachers reported exerting influence over instructional relevant school decisions was positively associated with a one standard deviation increase in perceived collective efficacy" (p.10). When teachers were able to exert an influence on important school decisions, they tend to have a strong sense of collective efficacy. Bandura (1997) refers to such practices as "group enablement" and observes that "collective enablement programs take many different forms, but the shared assumption is that they work in part by enhancing people's sense of efficacy to bring about change in their lives" (p. 503).

Adams and Forsyth (2006) went further on this topic and proposed the enabling school system as a type of proximate source of collective teacher efficacy. According to Hoy and Sweetland, an enabling school system is "a structure that is formed by enabling formalization and centralization; the rules, regulations, and procedures are helpful and lead to problem-solving among members" (2000, p. 531). An enabling school system fosters trust among teachers and between teachers and the principal, encourages truth-telling, and limits role conflict. Hoy stated that "when school structure was enabling, teachers trust each other, demonstrate professional autonomy, are not bound by rigid rules, and do not feel powerlessness" (2003, p.91).

Adam and Forsyth (2006) refer to Bandura's four sources of efficacy as the remote sources and postulated contextual environment, including enabling school system, a proximate source of teacher perceived group efficacy. In their study, Adam and Forsyth examined a cross-section of 79 schools randomly drawn from 101 school districts in one quadrant of a Midwestern state to investigate the relationship between prior academic performance, enabling school structure, socioeconomic status, school level, and collective teacher efficacy. Goddard's 12-item collective teacher efficacy scale and Hoy and Sweetland 12-item Likert type scale were used to measure collective efficacy and the enabling school structure. 545 teachers returned usable instruments. The state department of education provided the data for school socioeconomic status, school level, and prior academic performance. Findings showed that consistent with previous research, prior academic performance (β = .46, p < .001) accounted for the most variance in collective teacher efficacy. However, enabling school structure (β = .36, p < .001), socioeconomic status (β = -.23, p < .001), and school level (β = -.24, p < .001) "independently explained a significant proportion of variance in collective teacher efficacy, with enabling school structure being the

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most dominant" (p. 638). The study also revealed that "when enabling school structure, socioeconomic status, and school level were blocked and entered into the predictor set, the R-square increased from .54 to .74 (p < .001). The combined effects of these three variables accounted for an additional 20 percent of the explained variance in collective teacher efficacy, over and above the explained effect of prior academic performance" (p.637). Could the contextual environment be a source of collective teacher efficacy?

The idea that teachers' shared beliefs are shaped by external influences is not new. In 1986, Fuller and Izu evaluated factors that shape convergent beliefs among school staff from an organizational perspective. They examined data from145 elementary and 39 secondary schools involved in California's School Improvement Program and concluded that ideological convergence could be shaped by school managers and "the external sources of legitimacy and material resources on which the organization depends" (p. 527). Fuller and Izu's findings are interesting and inspiring. Should educational researchers start to look at the formation of collective teacher efficacy from an organizational point of view and study it as an organizational behavior or a part of school culture?

Further discussions

Besides the issues discussed above, there are more arguments about the sources of efficacy. In Cheung's comparative study on Hong Kong and Shanghai primary in-service teachers' perceived self-efficacy, Shanghai teachers identified three resources for their teaching efficacy: respect and confidence placed in them by students and parents, the training they received from universities and the experience they gained from daily teaching practice. Among these resources, only one (experience) directly related to Bandura's sources of self-efficacy (2008). Moreover, many educators consider knowledge, including pedagogical, technological knowledge, and subject-matter knowledge, as a resource for their perceived efficacy (Morris et al., 2017). Buehl and Fives (2009) also explored the sources of teachers' beliefs about their knowledge, and some of the sources did not align with Bandura's four resources. As Morris stated, "it would be premature to conclude that all appraisals of teacher knowledge are derived from the sources of self-efficacy identified by Bandura" (2017, p.820).

In addition to the lack of understanding of the sources and formation of collective teacher efficacy, there is the measurement issue of collective efficacy. The most commonly used collective teacher efficacy measures are variations of Goddard et al.'s 21-item Collective Teacher Efficacy Scale or its revised 12-item short version. Goddard's work has laid the foundation for collective efficacy research and made an outstanding contribution to the development of this research area. Nonetheless, Klassen et al. (2011) pointed out, in the literature review of teacher self- and collective efficacy research from 1998 to 2009, that some of the content of Goddard's measures "displays a lack of congruence with theory" (p. 35). Several items were orientated toward external determinants, and others focused on teachers' current abilities rather than on the "more theoretically congruent forward-looking capabilities" (p. 35).

The scale Somech and Drach-Zahavy (2000) used in their study included items that was incongruent with efficacy theory, such as "The teachers of this school have excellent job skills" and "Team teachers that can perform their jobs as well as this team are rare" (p. 653), which are also present focused. However, a few measures investigated in Klassen et al.'s review were more congruent with efficacy theory. For example, several studies used Tschannen-Moran and Barr's (2004) collective efficacy scale, a 12-item scale focusing on teachers' collective capabilities, e.g., "How much can teachers in your school do to produce meaningful student learning?" (p. 196), displaying a closer congruence to collective efficacy

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theory. Measurement issues and congruence with established theory are a severe problem affecting collective efficacy research (Klassen et al., 2011). The illegitimacy of the teacher collective efficacy measurements cast a shadow on their results and might lead to inaccurate conclusions of the research.

Conclusion

Collective teacher efficacy is a shared belief among teachers in a school or a department about their ability to impact positively on students' learning. A significant increase in research on collective teacher efficacy has been witnessed in American and international settings due to compelling empirical findings on its positive consequences, for example, higher students' achievement, increasing teachers' job satisfaction, and positive attitude toward professional development. In spite of the interests, little attention is paid to the theoretical construction.

First of all, more effort should be made in developing clear conceptualization and measures that are congruent with the theory. Furthermore, as Klassen and his colleagues said, we understand near to nothing about how collective efficacy forms at schools (2011). Further studies, particularly the ones with organizational perspective, are in need to paint a clear picture of the sources of collective teacher efficacy and how it forms in schools. Thirdly, teacher self-efficacy is subject and context specific, but with little research adopting qualitative or longitudinal approaches, there is only a modest understanding of how teachers' collective efficacy is influenced by context and how it changes over time. Finally, in Cheung's research, Shanghai teachers identified respect paid by students and parents as a factor that informed their perceived efficacy (2008). It is likely that a society's value on education plays a role in the formation of collective teacher efficacy. More cross-culture comparative research is needed to evaluate how collective teacher efficacy differ in cross-culture context.

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