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EVALUATING A CONCEPTUAL FRAMEWORK FOR TEACHER EDUCATION QUALITY

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Abstract. It is critical for teacher educators and scholars of teacher education to think carefully about the conceptual framework that they use to evaluate teacher education programs. Without a strong conceptual framework, it may be difficult for teacher educators to evaluate whether or not they are operating within a strong program. Thus, we frame this article as an opportunity to present one particular pre-existing framework in the research literature that can be used to conceptualize teacher education quality. We then present some evidence that supports and challenges this framework. In other words, the purpose of this inquiry is to evaluate the conceptual framework for teacher education quality proposed by Hsieh et al. [15]. In our attempt to create a supplementary evaluation of this conceptual framework, we test a statistical model using a different large international database – Teaching and Learning International Survey (TALIS) 2013. Specifically, we examine the effects of preparedness for content knowledge (CK), pedagogical content knowledge (PCK), and field-based practice on teachers' later performance satisfaction using *multiple linear regression* analysis. Our findings suggest that teachers who are more prepared for PCK and classroom practice (through field/clinical experience) during their teacher education program tend to be more satisfied with their teaching performance. However, our findings also suggest that becoming prepared in one's CK during teacher preparation does not, according to the respondents, have a significant impact on their satisfaction with their teaching performance. The findings of this study have implications for practice and future research.

Keywords: classroom practice, content knowledge, pedagogical content knowledge, performance satisfaction, teacher education quality

1. Introduction

Darling-Hammond [7, p. ix] considered the notion that *good teachers are born, not made* to be "[o]ne of the most damaging myths prevailing in American education" because, according to her, this myth leads to the assumption that "good teacher education programs are virtually nonexistent and perhaps even impossible to construct" [7, p. ix]. Consistent with Darling-Hammond's statement, Ball [2], Grossman [3], and Menter [19] all believed great teachers are

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made. In like fashion, Ingvarson et al. [16, p. 379, see also 10] stated, "[T]eacher education matters" and is necessary because, as existing studies [27, 28] indicated, features of teacher preparation programs such as the quality of student teaching and the number of methods courses significantly impacted and were positively associated with teacher outcomes. However, a recent cross-national study with large-scale samples conducted by Hsieh et al. [15] showed the opposite. Their findings demonstrated that the effectiveness of teacher education programs did not exert a noticeable influence on future teacher achievement in virtually all sixteen countries[1] investigated – that is, the effectiveness of a teacher preparation program did not guarantee high achievement of future teachers and vice versa. For example, Germany was placed in the middle rank in future teachers' teaching accomplishment; however, the effectiveness of Germany's teacher educators was ranked near the bottom [15]. As another example, the United States was rated as a mid-achieving country in respect of future teacher achievement; and this country earned the highest scores for the coherence between what pre-service teachers learn at their universities and their future needs as schoolteachers [15]. Relatedly, Taiwan's future teacher achievement was ranked as high-achieving, whilst the coherence between university and school levels of this nation lay at the bottom of the ranks [15]. Hsieh et al.'s research participants were international primary and lower secondary math teachers. To reexamine this conflict (i.e., the inconsistent findings on the role of teacher education programs in future teacher accomplishment shown in the existent literature) and, more to the point, to evaluate the conceptual framework for teacher education quality produced by Hsieh and colleagues (*the framework is elaborated in the section below*), the present study is designed using a different large international database, namely the Organization for Economic Co-operation and Development (OECD) – Teaching and Learning International Survey (TALIS) 2013. The informants of this database encompass not only international math teachers, but also those with all different teaching content areas (i.e., mathematics, science, social studies, modern foreign language, technology, arts, physical education, and others) [24]. Specifically, this inquiry examines the correlation between how prospective primary teachers are prepared through their teacher education programs and their future teaching success to provide a supplementary evaluation of Hsieh et al.'s conceptual framework.

[1] Botswana, Chile, Georgia, Germany, Malaysia, Norway, Oman, Philippines, Poland, Russia, Singapore, Spain, Switzerland, Taiwan, Thailand, and US-public (i.e., data from the U.S include only public institutions)

2. Conceptual framework

Hsieh and colleagues [15] developed a conceptual framework to investigate the quality of teacher education in a global (i.e., cross-national) context. Their conceptual framework consists of five indicators: (a) future teacher achievement (which is used to guide the present study), (b) effectiveness of instructors, (c) coherence between teacher education programs at universities and teaching at schools, (d) effectiveness of courses/content arrangement, and (e) overall effectiveness of teacher education programs. These five indicators fit into two broad categories: person quality and course quality. The summary of Hsieh et al.'s framework is shown in Figure 1.

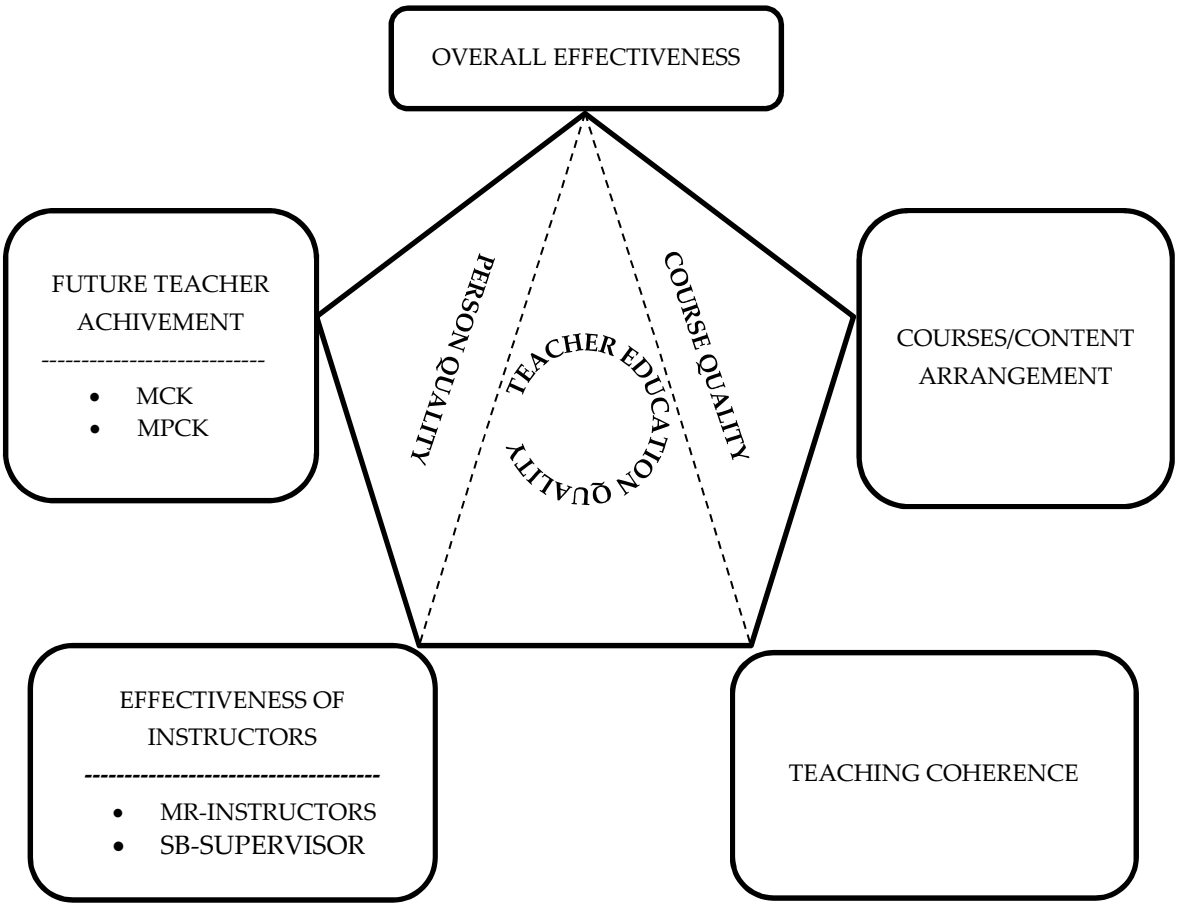

Figure 1. Teacher education quality framework [15, p. 175]

MCK = mathematics content knowledge; MPCK = mathematics pedagogical content knowledge; MR-instructor = instructor in mathematics-related courses; SB-supervisor = school-based supervising teacher.

To reiterate, one indicator of this umbrella conceptual framework – that is, "future teacher achievement" – is utilized to guide the present study. Note that teacher achievement and teacher performance satisfaction are used interchangeably in this paper. As shown in this sub-framework, content knowledge (CK) and pedagogical content knowledge (PCK – i.e., knowledge of how to teach a particular subject) are perceived as crucial factors in deciding future teacher achievement [6, 15, 29]. In addition to these two factors, pre-service field experience is also theorized to have a potent influence on later success of teacher candidates [5, 7, 13, 17, 28]. Therefore, all these three factors are included in the logic model (conceptual framework) for this study. The logic model investigated in this inquiry is depicted in the Figure 2.

Rooted in this logic model, the research question addressed is: How does preparedness for content knowledge, pedagogical content knowledge, and classroom practice (field/clinical experience) contribute to elementary teachers' later performance satisfaction?

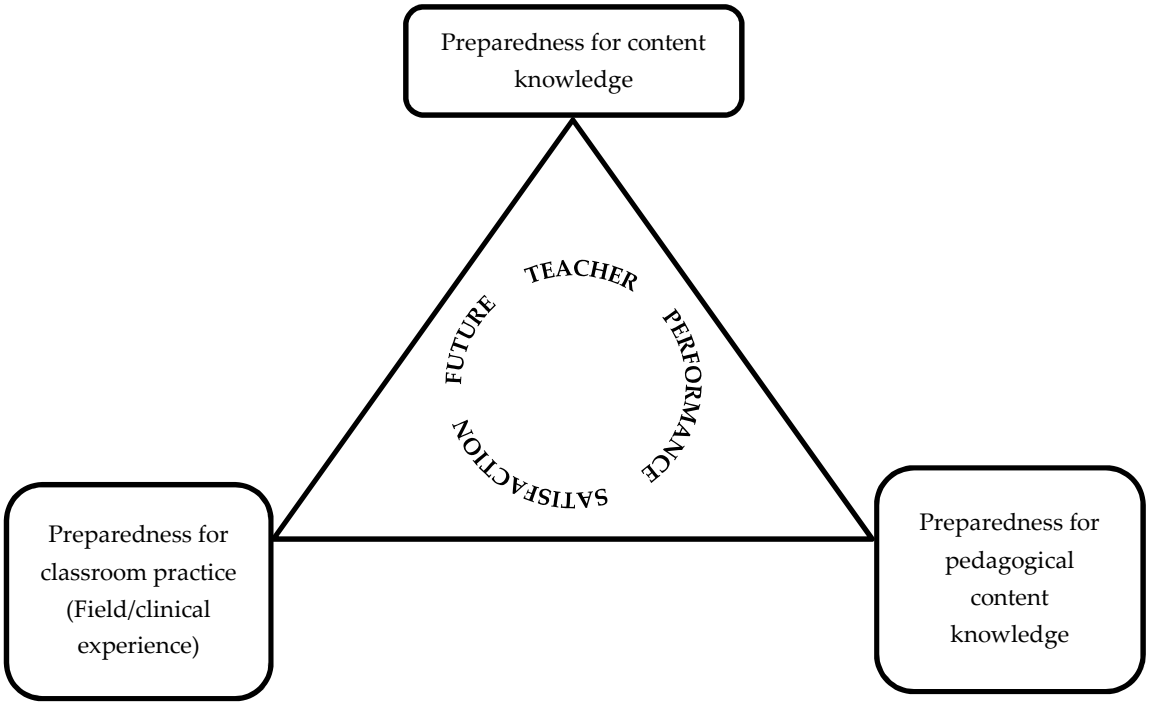

Figure 2. The logic model (conceptual framework) for future teacher performance satisfaction (adapted from Hsieh et al. [15, p. 175])

3. Literature review

It has been presumed that – to quote Cochran-Smith and Lytle [6, p. 249, emphasis in original] – "teachers who *know* more teach better." However, empirical findings related to this presumption have been inconsistent. For example, research demonstrated only moderate support for the significance of strong subject-matter knowledge to the effectiveness of a teacher, and revealed weak support for the assumption that besides a solid understanding of content knowledge, mastery of PCK is also of importance for teachers to be successful [1]. By contrast, other researchers [6, 10, 29, 31] found CK and PCK to be essential factors in future teacher effectiveness. In relation to practical experience, research suggests that clinical experience is influential in changing prospective teachers' beliefs and attitudes towards teaching [1, 18, 12, 22], and forming their teaching practice [7]. For example, Darling-Hammond [7, p. 44] reported, "[C]andidates often described how their extended clinical experiences, interwoven with coursework, helped them learn how to conceptualize teaching and enact their ideas in practice." Additionally, the proven correlation between field experience and later teaching effectiveness of teacher candidates was also documented [5, 7, 13, 17, 28]. As an example, Boyd et al. [5] found teacher preparation that underscored the salience of student-teaching experiences and provided prospective teachers with more opportunities to student teach would produce teachers who were significantly more effective in their teaching when they entered the teaching workforce. However, the research results are often inconsistent, hence still remain inconclusive [1, 16, 32]. Given the inconsistence and inconclusiveness of the research literature, this present study is designed, aiming to reexamine the relationship between the preparedness for CK, PCK, and classroom practice (through field/clinical experience) and later teacher effectiveness in a cross-national context to shed more light on these issues.

4. Methodology

4.1. Method

To examine how preparedness for CK, PCK, and classroom practice contributes to prospective elementary teachers' later teaching effectiveness, *multiple linear regression* was employed [11, 20, 30]. Urdan [30, p. 183] postulated that *multiple regression* "allows researchers to examine the nature and strength of the relations between variables, the relative predictive power of several independent variables on a dependent variable." In respect of the method of regression, we used *forced entry* (or *enter* as it is known in the SPSS) because, as explained by Field [11], *forced entry* (*enter*) – i.e., "a method in which all predictors are forced into the model simultaneously" [11, p. 322] – "relies on good theoretical reasons for including the chosen predictors" [11, p. 322]. Two (i.e., preparedness for CK and preparedness for PCK) out of three

predictors used in the present study were selected based on (one component – "future teacher achievement" – of) the conceptual framework by Hsieh et al. [15], the remaining predictor variable (i.e., preparedness for classroom practice) based on theoretical and empirical findings documented in the literature [5, 7, 13]. *Multiple linear regression* with the *forced entry* method is thus perfectly suitable for the nature and purpose of this study.

4.2. Data sources and variables

The data used for this inquiry were drawn from the Organization for Economic Co-operation and Development (OECD) – Teaching and Learning International Survey (TALIS) 2013, comprising 14,583 primary teachers (with years of teaching ranging from 0 to 51) from six countries: Denmark, Finland, Mexico, Norway, Poland, and Belgium [for further details, see 24, 25]. TALIS is, as Becker [4, p. 7] noted, "the first international series of surveys where the major focus is on the learning environment and the working conditions of teachers in schools." The total number of countries participating in TALIS 2013 was 34. It was compulsory for all participating nations to administer the survey at the lower secondary education level; however, administering the survey at the primary and upper secondary levels was optional [4, 25]. Given these options, in TALIS 2013, the number of countries opting to survey primary teachers was 6 (of 34) (as shown above) and the number of those taking part in the upper secondary level survey was 10 (of 34) (viz. Australia, Denmark, Finland, Iceland, Italy, Mexico, Norway, Poland, Singapore, and United Arab Emirates) [25]. The questionnaires were filled out either on paper or online and took teachers around 45–60 minutes to complete; data were collected from September to December 2012 for southern hemisphere nations and from January to May 2013 for those in the northern hemisphere [4]. The present study used survey data for primary teachers only. It utilized a small portion (i.e., four variables) of this large data set.

The four survey questions included in our investigated model as independent and dependent variables are displayed in Table 1. These questions were answered on a Likert scale with *not at all*, *somewhat*, *well*, and *very well* being used for Items TT2G13A, TT2G13B, and TT2G13B and *strongly disagree*, *disagree*, *agree*, and *strongly agree* for Item TT2G46I. Noteworthy is that with this data set, a 4-point scale was utilized instead of a 5-point scale (i.e., including a midpoint such as 'neutral' or 'neither disagree nor agree'). This is, however, not a matter of concern because, as Dillman et al. [as cited in 23, p. 75] elucidated, "[W]hile many people agonize over the decision of whether or not to offer a midpoint, the literature suggests whether one offers a midpoint has little effect on the resulting data quality and conclusions drawn from the data."

Table 1. Variables utilized in the study

Independent/predictor variables	**Questions/Items**	**Scales**
Preparedness for CK	13. In your teaching, to what extent do you feel prepared for the elements below? *Please mark one choice in each row.* **TT2G13A** – a) Content of the subject(s) I teach	1 = Not at all 2 = Somewhat 3 = Well 4 = Very well
Preparedness for PCK	13. In your teaching, to what extent do you feel prepared for the elements below? *Please mark one choice in each row.* **TT2G13B** – b) Pedagogy of the subject(s) I teach	1 = Not at all 2 = Somewhat 3 = Well 4 = Very well
Preparedness for classroom practice	13. In your teaching, to what extent do you feel prepared for the elements below? *Please mark one choice in each row.* **TT2G13C** – c) Classroom practice in the subject(s) I teach	1 = Not at all 2 = Somewhat 3 = Well 4 = Very well
Dependent/outcome variable	**Question/Item**	**Scale**
Future teacher performance satisfaction	46. We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements? *Please mark one choice in each row.* **TT2G46I** – i) I am satisfied with my performance in this school.	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree

4.3. Data analysis

First, the data on these four variables were screened using SPSS to examine the seriousness of missing cases. This first pre-analysis data-screening step yielded the results that the variable preparedness for CK had 1.1% cases missing, preparedness for PCK 1.3%, preparedness for classroom practice 1.2%, and future teacher performance satisfaction 3.7%. As these variables each had less than 5% cases missing along with the sample size being large (14,583 elementary teachers), the method of listwise deletion was deployed to exclude all those missing cases from our whole analysis [20]. The data were then screened again to assess the univariate and multivariate normality. The evaluation suggests that the normality of distribution of each individual variable and that of the combination of these four variables are tenable [20]. Finally, *multiple linear regression* analysis was performed to answer the research question.

5. Results

As mentioned previously, since *multiple linear regression* with the *forced entry* method was employed, all these three predictor variables were simultaneously entered into the model. The regression results indicate that tolerance statistics are greater than 0.1 (specifically, the tolerance value for preparedness for CK is 0.441, PCK 0.361, and classroom practice 0.448), which suggests that evidence of multicollinearity among the predictors does not exist [20]. The regression results demonstrate that the overall model significantly predicts the level of future teacher performance satisfaction [R^2= 0.019, R^2_{adj} = 0.018, $F(3,13858) = 87.076$, $p < 0.001$]. Yet, this model accounts for only 1.9 percent of variance in future teacher teaching satisfaction, whereas up to 98.1 percent of variance in future teacher teaching satisfaction is left unexplained. These findings, in general, are consistent with those by Hsieh et al. [15] which indicate that the quality of teacher education program produces little effect on future teacher achievement. The present study's results show further that only two (preparedness for PCK, and classroom practice) out of the three variables significantly contribute to the prediction model, in which preparedness for classroom practice ($\beta = 0.087$, $p < 0.001$) is the stronger predictor, followed by preparedness for PCK ($\beta = 0.059$, $p < 0.001$). These two predictors are positively associated with later teacher effectiveness. More specifically, as preparedness for classroom practice increases by one unit, future teacher achievement increases by 0.062 units; and as preparedness of PCK increases by one unit, future teacher achievement increases by 0.044 units. This particular result confirms the common theme in the existing teacher education literature that pre-service field experiences (including classroom practice or student teaching) are perceived as the most influential component of teacher preparation programs [8, 26, 27].

Of particular note, the estimate for the effect of perceived preparedness of CK ($\beta = 0.000$, $p = 0.973$) is not statistically significant, suggesting that this factor does not have a significant influence on future teacher achievement. This is somewhat surprising, for we anticipated that teachers who feel more prepared in CK might feel more satisfied with their teaching performance. However, one possible explanation for this non-significance is that, as Allen [1] concludes in his review of the literature, subject knowledge in primary education is easier and simpler, elementary teachers, thus, do not need to have a thorough subject-matter preparation as secondary teachers to be effective. The summary of regression coefficients is provided in Table 2.

Table 2. Coefficients for model variables

	B	β	*t*	*p*	Bivariate *r*	Partial *r*
Preparedness for CK	0.000	0.000	0.034	0.973	0.099	0.000
Preparedness for PCK	0.044	0.059	4.206	<0.001	0.122	0.036
Preparedness for classroom practice	0.062	0.087	6.909	<0.001	0.130	0.059

6. Discussion and conclusion

The purpose of this study is to evaluate the conceptual framework for teacher education quality invented by Hsieh and colleagues [15]. In our attempt to create a supplementary evaluation of this conceptual framework, we test a statistical model using a different large international database – the OECD – TALIS 2013 [24]. Specifically, we examine the effects of preparedness for CK, PCK, and field-based practice on teachers' later performance satisfaction. It is found that teachers who are more prepared for PCK and classroom practice (through field/clinical experience) during their teacher education program tend to be more satisfied with their teaching performance than those who are less. This finding supports part of the conceptual framework proposed by Hsieh et al. and other empirical findings pointing to the importance of PCK [16, 29] and clinical experience [5, 13, 17, 28] to later outcomes of teachers. In contrast, as this study shows, the level of preparedness for CK has no significant effects. This challenges one portion of the framework by Hsieh et al. and prior empirical results [cf. 10] that demonstrate a positive impact of preparedness for CK on teaching effectiveness as teachers enter full-time teaching.

Several implications for teacher education and schools can be drawn from this inquiry's findings. First, as this study reveals, PCK and school-based clinical experiences are two aspects of preparation that are positively related to elementary teacher candidates' future teaching success, elementary teacher education, thus, should focus more squarely on these two areas. Specifically, elementary teacher education programs should increase the amount, and more importantly, the quality of student teaching [27] in conjunction with equipping pre-service students with a strong realm of knowledge about methods of instruction (i.e., requiring more PCK coursework) [see 28]. Second and relatedly, primary schools should consider hiring teachers with more preparation in practice teaching and PCK because these factors are, as this study shows, predictive of teacher effectiveness. Finally, this model explains only 1.9 percent of the variance in future teaching effectiveness, signifying that – in the words of Morris et al. [21, p. 803] – "the instructional task is

inherently complex, the excellent teacher must be competent or "efficacious" in many ways." That is, to be successful in their teaching career, teachers need to acquire not only knowledge *for* practice (i.e., formal knowledge and theory such as subject matter, educational theory, pedagogy, and instructional strategies acquired through formal teacher education and professional development), but also knowledge *in* practice (i.e., practical knowledge gleaned from classroom experiences and reflections in and on those experiences), and knowledge *of* practice (i.e., local knowledge generated as teachers actively research their own practices, students, classrooms, schools to theorize their work and (re)construct knowledge and curriculum) [6]. Stated differently, learning to teach is a board continuum from pre-service preparation to the induction phase to continued professional development [9]. All this suggests that it would be beneficial for in-service teachers if schools are organized in a way that nurtures on-the-job learning and each individual teacher views their own continuing learning to teach as part of their job [6, 8]. As Feiman-Nemser [9, p. 1048] felicitously puts it, "Some knowledge can best be gained at the university, but much of what teachers need to know can only be learned in the context of practice."

7. Limitations and directions for future studies

First, one possible limitation of this study is that this study is to evaluate the framework by Hsieh et al. [15] which is originally developed to measure the quality of mathematics teacher education; while the informants of this study encompass not only math teachers, but also those with various teaching subject areas and at all levels of experience – specifically, their years of teaching experience range widely from 0 to 51 [24]. The results might vary by different teaching content areas, different school levels (elementary, middle, or high school), and different kinds of schools (e.g., urban, nonurban, elite, non-elite, easy-to-staff, or hard-to-staff schools), as Grossman et al. [14, p. 329] aver, "[I]n many ways teaching is a local profession." Additionally, as Goldhaber et al. [13, p. 351] point out, "[T]eacher education effects decay over time" – otherwise put, the effects of teacher education programs on later teaching performance are stronger for early-career teachers than for more experienced teachers. Therefore, more studies which are designed in a more context-specific manner are needed to re-examine and enrich the findings in this regard.

A second limitation is that due to a lack of pertinent data, we can evaluate only one indicator of Hsieh et al.'s framework – that is, "future teacher achievement." The other four components within this framework are still left unevaluated in this study. Future researchers may want to continue to examine if the conceptual framework created by Hsieh and colleagues is valid. Are there any components that might be missing? Are there any components that deserve

more emphasis than others? Can (and should) all teacher education programs be conceptualized and evaluated according to this framework, or can the evaluation of teacher education programs be more contextual? What are the implications of these answers for the teacher education profession?

Finally, one of the findings of this inquiry (i.e., the estimate for the effect of preparedness of CK is not statistically significant) challenges Hsieh et al.'s framework. However, on account of being devoid of qualitative data, evidential reasons for preparedness for CK being an insignificant predictor of future teacher satisfaction, in this study, remain uncovered. To address this limitation, qualitative studies associated with this issue are needed to extend our understanding of this phenomenon.

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