China & World Economy

China & World Economy / 86–104, Vol. 24, No. 3, 2016

Implementation of Teacher Training in China and Its Policy Implications

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Abstract

This study describes the current teacher training system in China, including the prevalence of teacher training, the types of training, training content and the ways that training is delivered. The paper presents subjective evaluations of training for principals and teachers using four diverse datasets. The results show that the National Teacher Training Project (NTTP) deviates from official policy objectives in several respects. The subjects of training programs and training content are not fully compliant with policy objectives. In addition, training opportunities are offered to a smaller proportion of rural teachers than urban teachers. It is found that the proportion of teachers and principals satisfied with the NTTP is lower than that for other types of training. Therefore, measures should be taken to increase training opportunities for rural teachers and to ensure the quality of training for all teachers.

Key words: China, program implementation, teacher training
JEL codes: I20, I25, R10

I. Introduction

Currently, China is experiencing an economic transformation from low-wage manufacturing toward higher-valued service industries (Zhang *et al*., 2011). Like many other developing countries, China needs to raise the level of human capital to complete this economic transformation (Autor *et al*., 2003; Heckman and Yi, 2012).

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Without a labor force with sufficient skill, the country's economic development will ultimately stagnate (e.g. Mincer, 1984; Hanushek and Woessmann, 2008). Education is one of the most important inputs in a nation's economic development (Barro, 1991; Psacharopoulos, 1994), and increased investments in education can help sustain China's economic transformation.

However, investments in education are not distributed evenly across China. Students in rural China lag behind those in urban areas in terms of both the quantity and the quality of education. In China, rural children's school attainment rates are low and dropout rates from academic and vocational high schools are persistently high across all levels of schooling (e.g. Li *et al*., 2015; Shi *et al*., 2015). A series of in-the-field studies have found junior high school dropout rates of rural students ranging from 18 to 31 percent across some provinces (Yi *et al*., 2012; Mo *et al*., 2013; Li *et al*., 2015). An analysis of these studies concludes that among rural students who enter junior high school, only 37 percent go on to graduate from high school (Shi *et al*., 2015). In addition, the academic performance of rural students is worse than that of urban students. Students from poor rural counties perform significantly worse on the college entrance examination than those from non-poor counties (Loyalka *et al*., 2014). Using survey data and the Trends in International Mathematics and Science Study test developed by the International Association for the Evaluation of Eucational Achievement to trainees, Lai *et al*. (2014) find that migrant school students outperform rural students by 2.7 points. Because it is likely that the achievement gap would be even wider if migrant students entered ordinary urban public schools, these results suggest that rural primary students are particularly disadvantaged in terms of the quality of education.

There are many possible reasons why rural students, especially those from poor rural areas, are lagging so far behind urban students in educational performance. Much of the achievement gap can likely be attributed to fundamental differences in financial and human resources between rural and urban areas. Rural schooling facilities are worse than those in urban areas (Wang *et al*., 2009). Similarly, because average incomes in urban areas are more than three times rural income levels, parents of urban students also have more resources to invest in their children's education (NBS, 2011). It is also the case that parents of urban students have much higher levels of education and generally have more time and ability to help with their children's learning (Huang and Du, 2007).

There are many ways to narrow the achievement gap between rural and urban students; many scholars recognize that investing in the quality of teachers may be one of the most important ways to influence student achievement (Darling-Hammond, 2000; Rivkin *et al*., 2005). Using data from a 50-state survey of education policies and performance in the USA, Darling-Hammond (2000) finds that measures of teacher

preparation and certification are by far the strongest correlates of student achievement. Using matched panel data from the Texas Schools Project conducted by the University of Texas at Dallas, Rivkin *et al*. (2005) suggest that teacher quality plays an important role in determining the academic achievement of students.

Although fewer in number, studies from developing countries have also documented how variation in teacher quality can lead to substantial differences in student achievement. For example, Metzler and Woessmann (2012) find that an increase in subject-specific teacher achievement significantly improves student achievement in Peru. In Shaanxi Province in China, Chu *et al*. (2015) find that having a teacher with the highest rank (a credential based on annual assessments by local administrators) had a more positive impact on student achievement than having a teacher who had not yet achieved the highest rank.

One method that is effective for improving teacher quality is teacher training (Yoon *et al*., 2007). Although there have been no rigorous evaluations of teacher training in China, this does not mean that China's Government does not recognize the importance of improving teacher quality. In 2010, the Chinese Government began to implement the National Teacher Training Project (NTTP). From 2010 to 2013, the central government devoted nearly RMB4.3bn (US$660m) to support training activities across the country (Yan, 2013). Policy-makers at the national and provincial levels have also released a series of policy documents demonstrating the objectives of the government's teacher training effort (e.g. MOE, 2010, 2011, 2012). For example, the Ministry of Education (MOE, 2011) mandated that each teacher in China would receive 360 h of training over the next 5 years. It is clear that the NTTP is one of the key ways through which the education system will realize this goal.

In spite of the large investment in teacher training and the nation's ambitious goals, few studies have comprehensively explored the current state of NTTP implementation in China. In particular, there is an absence of empirical-based research on the NTTP in the international literature. Most studies that do exist in the Chinese literature only examine certain aspects of the NTTP or make use of surveys with small sample sizes. For example, Zuo and Su (2012) only provide subjective evaluations of NTTP training from participants in one training program. Similarly, Li (2013) describes a single training program using interviews with trainers. Therefore, little is known about the current implementation of the NTTP in China today.

While the NTTP is the most visible manifestation of teacher training in China, teacher training opportunities are also offered through other levels of the governmental system (such as at the provincial, prefectural, county, school district and school-level). However, little quantitative research has been conducted to understand the prevalence

of these different training opportunities and perceptions of the relative effectiveness of each type of training. To our knowledge, Chen and Wang (2013) is the only study conducted that examines the forms of training offered by different levels of government.

The purpose of our study is to describe the landscape of teacher training in China today, and to highlight potential areas in need of improvement that can be addressed by future policy. To meet this goal, the present paper has five specific objectives. First, we assess the prevalence of teacher training opportunities. Specifically, we investigate how many teachers are being trained under the NTTP and programs offered by other levels of government. Second, we assess how educational officials target teachers for training, specifically examining what kinds of teachers receive training and how they are being selected. Third, we describe the content of teacher training and compare what we are finding to official policy goals. Fourth, we describe the ways that different forms of teacher training are delivered, both in terms of the types of trainers and the venues in which teachers receive training. Finally, we describe the subjective evaluations of principals and teachers on different types of teacher training and compare the perceived effectiveness of these different programs.

The remainder of the paper is structured as follows. Section II introduces the data used in the present paper, as well as the sample selection and data collection process. Section III reports the results of the study, which allow us to describe the landscape of teacher training in China today. Section IV discusses the results and concludes.

II. Data

In the present paper we use different datasets to reach our stated objectives. We rely on four types of data: interview data, administrative data, principal and teacher survey data and observational data. The interview data, principal and teacher survey data, and observational data were collected by our research team, while the local government provided us the administrative data. All data sources are detailed in Table 1.

To gain a preliminary understanding of the way in which teacher training is carried out in China, we conducted a series of interviews with a variety of actors who oversee, conduct and receive teacher training in China (our interview data). Enumerators followed a detailed interview protocol with 21 teachers (both teachers who had and had not attended on-site NTTP training in 2013), 8 principals, 3 government officials, and 4 employees of teacher training institutions. The information gathered from these interviews was used to further investigate the channels through which teachers were targeted and selected to participate in forms of teacher training.

Second, for the present study, we use an administrative dataset for 2011–2013

Table 1. Description of Data Sources

Name of dataset	Number of observations	Data source
Interview data	21 teachers, 8 principals, 3 officials, 4 organizations	In June 2014 we interviewed 21 teachers and 8 principals in Tongchuan City, Shaanxi Province. One part of our sample was selected from the list of teachers who had attended on-site NTTP training in 2013, which was provided by the local NTTP office. The other part of the sample from the list of teachers who had not attended on-site NTTP training in 2013, which was provided by the Bureau of Education of Tongchuan City. We then randomly chose 5 rural schools at which to conduct interviews. We also interviewed 3 members of the Bureau of Education of Tongchuan City about teacher training allocation. Finally, in August 2014, we interviewed the directors responsible for leading NTTP teacher training from four different training organizations.
Administrative data	12 726 trainees	The data are provided by the Shaanxi NTTP office.
Principal and teacher survey data	68 principals 84 teachers	We selected two NTTP sessions for primary school mathematics in Shaanxi Province. First, we included all participants who are current primary school mathematics teachers (34 teachers in total). Then, we checked to see whether there was another mathematics teacher in that school that taught the same grade as the participant teacher. If there was, then we included this teacher in our sample (16 teachers in total). Second, we selected schools that were similar to those receiving NTTP training (determined by distance from school receiving training, number of students and education quality as assessed by the county education bureau). We then randomly selected one mathematics teacher from the same grade as the teachers receiving training in the non-participant schools (34 teachers). We also surveyed principals at each school included in our sample (68 principals).
Observation data	2 observations	We observed NTTP training sessions in Xianyang and Weinan Prefectures, both located in Shaanxi Province.

Note: NTTP, National Teacher Training Project.

that was provided to us by the Shaanxi provincial NTTP office. These data allow us to evaluate the prevalence of teacher training opportunities and to assess how teacher training targets are set and implemented across Shaanxi Province. Specifically, we use variables on the numbers and types of trainees, the allocation of training opportunities across different types of teachers, the subjects taught during training, and a categorization of the types of institutions that offered the training.

Third, in 2014 we collected survey data for the NTTP and other available forms of teacher training from a sample of 68 schools in two prefectures of Shaanxi Province. We refer to this as our principal and teacher survey data. This survey solicited information from respondents concerning the frequency and amount of training received during the 2013–2014 academic school year, the training content provided, and the opinions of principals and teachers about different forms of teacher training. Based on information

from the principal and teacher survey data, we seek to understand the intensity of typical training sessions, the content of training, the opinions of principal and teachers regarding the training's effectiveness, as well as the process through which teachers were selected to participate in training.

Finally, to gain a further understanding of the ways in which teacher training is conducted in China, members of our enumeration team also directly observed NTTP training sessions. These in-training session observations were carried out in two NTTP training courses in Xianyang and Weinan Prefectures, Shaanxi Province. In the rest of the present paper these data are referred to as our observational data. While we do not seek to draw empirical-based, definitive conclusions from these non-quantitative data, seeing first hand the way in which NTTP training is conducted allowed us to gain a more comprehensive interpretation of the landscape of teacher training.

III. Results

In this section we report the results of our study. We first report on the prevalence of teacher training, both in terms of the NTTP and other forms of training. Then, we evaluate the types of teachers attending NTTP on-site training. Following this, we discuss our findings on the content provided within training sessions. Then, we examine the ways in which teacher training is delivered. Finally, we assess the subjective evaluations of principals and teachers on different types of teacher training.

1. Prevalence of Teacher Training Opportunities

Our findings provide insight into which forms of teacher training are the most accessible to our sample within our principal and teacher survey data. The results suggest that few teachers each year are provided the opportunity to attend NTTP on-site training. According to policy (Education Department of Shaanxi Provincial Government, 2011, 2012, 2013a), the proportion of teachers in Shaanxi who are expected to attend on-site NTTP training per year is only 1.8 percent of the province's teaching staff (see row 1, column 3 of Table 2). However, according to the administrative data, the actual number of teachers participating in NTTP on-site training falls slightly short of the number of individuals that the province's NTTP office mandated. As seen from Table 2, from 2011 to 2013 only 1.6 percent of teachers in Shaanxi actually attended on-site training.

However, this situation does not hold for NTTP training that is provided online. Compared to NTTP on-site training, NTTP online training offers a greater number of teacher training opportunities. According to policy targets of the Education Department

Table 2. Prevalence of Teacher Training Opportunities Per Year in Shaanxi Province, 2011–2013

	Total number of teachers	On-site NTTP training		On-site and online NTTP training	
		Number of teachers trained (2011–2013)	Proportion of teachers trained (2011–2013) (%)	Number of teachers trained (2011–2012)	Proportion of teachers trained (2011–2012) (%)
Policy mandated	273 346	15 140	1.8	133 350	24
Actual	273 346	12 726	1.6	73 846	14
Difference	0	2414	0.2	59 504	11

Source: Author's own calculations using administrative data and policy documents from the Education Department of Shaanxi Provincial Government (2011, 2012, 2013a).
Note: NTTP, National Teacher Training Project.

of Shaanxi Provincial Government (2010, 2011, 2012, 2013a, 2014), 92 percent of all teachers that participated in NTTP training between 2010 and 2014 were meant to do so through online training (see row 3, column 7 of Table 3). This figures accounts for approximately 23 percent of all teachers per year (92.3 percent/4 years). As shown by our data, the actual share of teachers that participated in online training was close to 90 percent both in 2011 and 2012 (see row 3, columns 2 and 4 of Table 4). Although

Table 3. Number of Teachers Supposed to Attend the National Teacher Training Project in Shaanxi Province, 2010–2014

	2010	2011	2012	2013	2014	Total	Ratio (%)
Midwest short-term intensive training	5920	3800	3050	3860	6282	22 912	6.0
Midwest long-term intensive training	1000	1350	1650	1430	1300	6730	1.8
Online training	60 000	66 000	57 400	56 400	113 020	352 920	92.3
Total	66 920	71 150	62 200	61 690	120 602	382 562	100

Source: Authors' own calculations using policy documents from the Education Department of Shaanxi Provincial Government (2010, 2011, 2012, 2013a, 2014).

Table 4. Number of Teachers That Actually Attended the National Teacher Training Project in Shaanxi Province, 2011–2013

	2011		2012		2013	Total
	Number	%	Number	%	Number	Number
Central-west short-term intensive training	3230	8.1	2561	7.6	3196	8987
Central-west long-term intensive training	1166	2.9	1354	4.0	1219	3739
Remote training	35 535	89	30 000	89		
Total	39 931	100	33 915	100		

Source: Authors' own calculations according to administrative data provided by the Education Department of Shaanxi Provincial Government (2013b).

this figure falls slightly short of the policy target, it shows the extent to which teacher training is provided through online platforms.

Out of all forms of teacher training in China (including NTTP), we find that the type of training program that provides the most training opportunities is county teacher training. According to our data, 67 percent of teachers within our principal and teacher survey data attended county training in 2013 (see row 5, column 1 of Table 5). Other forms of training that offered large numbers of training opportunities are training courses provided at the city-level (available to 39 percent of sample teachers), through online and on-site NTTP training (available to 33 percent of sample teachers) and at the province level (available to 23 percent of sample teachers; see rows 1–3, column 1 of Table 5). As shown in Table 5, approximately 89 percent of all teachers participated in training at least once in 2013 (see row 7, column 1 of Table 5). Therefore, in recent years almost all teachers in Shaanxi Province received some form of training .

However, when we examine the amount of training offered in terms of hours per course, we find that the amount of training hours provided varies among types of training. As seen in column 4 of Table 5, the hours trained per course through the NTTP (both in terms of online and on-site training) are the highest (79.2 h per course). After national teacher training, the amount of training hours offered by forms of government are the highest for provincial teacher training (72.2 hours per course), then city teacher training (42.7 h per course) and, finally, county teacher training (28.7 h per course).

Table 5 also presents the cumulative hours attended per teacher provided by each form of training during the 2013 school year (see column 3 of Table 5). We find that the NTTP (online and on-site) provided the highest cumulative training hours per teacher in 2013 (33 h). After NTTP, the amount of cumulative training hours offered per teacher are highest for county teacher training (31.1 h), then city teacher training (19.3 h) and, finally, province teacher training (17.2 h).

Table 5. Times and Hours of Teachers Attending Each Levels of Training in Shaanxi Province, 2013

Level of teacher training	% of teachers having participated at least once	Average times attended	Average hours attended (cumulative course)	Average hours trained per course	Average days trained per course
National teacher training	33	0.4	33	79.2	9.9
Province teacher training	23	0.2	17.2	72.2	9.0
City teacher training	39	0.5	19.3	42.7	5.3
County teacher training	67	1.1	31.1	28.7	3.6
School district teacher training	37	1.0	6.8	6.7	0.8
In-school teacher training	57	3.9	14.6	3.7	0.5
All types of training	89	7.11	122	17.2	2.2

Source: Data were collected by the authors.

Because our surveyed sample is a subgroup of teachers who either attended the NTTP or were similar to teachers who attended the NTTP, there is a possibility that we may have overestimated the prevalence of training opportunities available to the average rural teacher. However, our findings are corroborated by data collected in 2013 surveying a large, randomly selected sample of schools in Shaanxi and Hebei Provinces (collected by the authors). According to these data, teachers from rural Shaanxi and Hebei attended two training sessions, on average, during 2012.

2. Targeting Teachers for Teacher Training

According to our administrative data, 66 percent of trainees that participated in NTTP on-site training from 2011 to 2013 were from rural areas. Although this share of rural teachers meets the mandated policy targets of the MOE (2010), it is actually less than the share of rural total teachers in Shaanxi Province. We find that only 4.0 percent of rural teachers participated in on-site training from 2011 to 2013, whereas 6.8 percent of urban teachers did (see column 3 of Table 6). The differences between rural and urban participation rates suggest that, although the majority of trainees are rural teachers, the probability of rural teachers being offered opportunities to participate in NTTP on-site training is significantly smaller than that of urban teachers ($p = 0.00$).

Table 6. Gap in Access to the On-site National Teacher Training Project in China, 2011–2013

	Total number of teachers	Trainees	Trainees as a percentage of total (%)
Rural teachers	210 667	8387	4.0
Urban teachers	62 679	4280	6.8
Total	273 346	12 667	4.6

Source: Authors' own calculations using administrative data from the Education Department of Shaanxi Provincial Government (2013b).

Our data can also provides us with an understanding of how many NTTP trainees are primary school and junior high school teachers. We do this by examining the target schooling level of NTTP training attended. According to our administrative data, from 2011 to 2013, 57 percent of trainees in the NTTP received training aimed at junior high school teachers, 27 percent of trainees received training aimed at primary school teachers, and 12 percent of the trainees attended mixed junior high and primary school training sessions. These data suggest that the majority of NTTP on-site training positions were allocated to junior high school teachers.

In terms of the method through which training slots are allocated, our data suggest that this process can best be described as decentralized and opaque. According to interview data, the provincial NTTP office first decides how many training programs will be conducted that year and how many teachers can attend. Then, the province allocates

training slots among its prefectures. Each prefecture then decides how to allocate training slots among counties or districts. This process continues as training slots are further divided among school districts and schools. According to our interviewees, slots are allocated between each level of administration on the basis of population (with the larger prefectures, larger counties and larger schools receiving more slots). The interviews also suggest that there is a fair amount of discretion in allocation decisions within each level and very limited oversight from higher levels of authority, as well as potential room for the influence of *guanxi* (connections) in slot allocation.

In addition, interviews suggested that teachers from more advantaged schools are disproportionately provided with opportunities to attend training. Because training slots are allocated to schools based on the number of teachers, those who teach at smaller, rural schools infrequently receive opportunities to attend NTTP training sessions. In addition, because of the fact that NTTP training sessions are mostly conducted during the school year, teachers at these schools face barriers to attending training when there is no other teacher to cover their classes.

After the training slots are allocated by the county to different schools, the principals decide which teachers will attend the training sessions. In theory, teachers either attend training totally voluntarily, voluntarily apply and then are chosen by their superior, or their superior selects them to attend the training. Our principal and teacher survey data reflect that most participating teachers (89 percent) were ultimately chosen by their superiors to attend (see rows 1–2, column 1 of Table 7). In addition, our data show that 38.5 percent of trainees were selected by their superiors without first applying to attend training (see row 1, column 1 of Table 7). When asked about this training selection process, many interviewees believed it was suboptimal. We were told more than once that when the process was fully controlled by the principal, it was often harmful to the quality of training provided. Unmotivated trainees often did not participate and this was thought to diminish the effectiveness of the training.

Table 7. Decision-making of Teacher Training Participation in China, 2013

Who decided whether you can participate in the training	National (%)	Provincial (%)	City (%)	County (%)	School district (%)	School (%)
Completely decided by the superior	38.5	57.9	57.6	58.9	54.8	47.8
Voluntary application and then determined by the superior	50.0	31.6	36.4	25.0	25.8	23.9
Entirely voluntary application	11.5	10.5	6.1	16.1	19.4	28.3
Number of observations	28	19	33	56	31	48

Source: Data were collected by the authors.

Note: A school district usually includes one or several schools. In principle, students are required to study in the school district near to their home.

3. Training Content of Teacher Training

Our administrative data suggest that the academic content covered in the NTTP on-site training varies slightly from what is required by policy. Official subject matter designations for NTTP training reveal that 44 percent of teachers attending NTTP on-site training were trained in core academic subjects, including mathematics, Chinese language and English language. Beyond the core academic subjects, 35 percent of teachers attending NTTP on-site training received training in elective class subjects, such as science, art and history classes. The remaining 21 percent of teachers were instructed on other subjects, such as school management. According to the policy of the Education Department of Shaanxi Provincial Government from 2011 to 2013, the proportion of teachers receiving training related to academic, elective and other subjects should be 36, 35 and 19 percent, respectively (Education Department of Shaanxi Provincial Government, 2011, 2012, 2013a). Therefore, our findings indicate that the portion of teachers receiving training in elective subjects is in line with policy objectives; the share of teachers receiving training in core academic and other subjects deviates slightly.

In addition, our data suggest that the distribution of training content in terms of topics related to teaching behavior (e.g. ethics and personal growth, content knowledge and pedagogy) falls short of the standards stipulated by policy. According to MOE policy, in each training program 10 percent of training content should be dedicated to ethics and personal growth, 40 percent to content knowledge, and 50 percent to pedagogy (MOE, 2012). However, using the principal and teacher survey data we find that only 57 percent of trainees received instruction in ethics and personal growth, 79 percent of trainees received instruction in content knowledge, and 71 percent of trainees received instruction in pedagogy. In fact, only 18 percent of teachers reported having received all three components through the NTTP. This suggests that the actual training content frequently does not meet the requirements of national policy.

4. The Way Teacher Training is Delivered

Through our administrative data, we learn that teacher training is conducted at four types of venues: college campuses, primary schools, junior middle schools and professional teacher training institutions. Our data also suggest that training completed on college campuses is the most common, as 81 percent of teachers in this sample were trained on college campuses. Of all training sessions in Shaanxi Province conducted on college campuses, 93 percent were located in Xi'an city. However, only 11 percent of trainees in our sample were from Xi'an. While having training in Xi'an might mean that the quality of the instructors is higher, it may have implications for the cost of conducting training.

Clearly, when training is conducted away from home, out-of-pocket and opportunity costs can be high for teachers. There may also be issues regarding the appropriateness of training content for all trainees.

Through our observational data and interview data, we also find that there are many instructors involved in each training program. According to policy documents (MOE, 2010, 2012), the team of instructors should be composed of college experts, experienced teachers and education researchers. The mix of occupations involved in the training is intended to ensure a high level of instruction quality (MOE, 2012). However, our observational data revealed that there was little communication between trainers to ensure the consistency of training content. If this lack of communication is common, it could reduce the effectiveness of the training program on the whole, regardless of the capability of the instructors.

In addition, according to our interview data, teacher training sessions held in universities were typically taught by university professors. Although findings from our interview data cannot be deemed representative, this is consistent with the existing literature on teacher training in China (Chen and Wang, 2013; Zou *et al*., 2013). Although these professors may have a more advanced understanding of teaching methods, it may be the case that college professors teach at too theoretical a level for rural teachers to understand (Chen and Wang, 2013). This assumption was corroborated by findings from our interview data, where most teachers interviewed reported that they believe college professors do not adequately understand the reality of teaching in rural areas.

5. The Subjective Evaluations of Principals/Teachers on Different Types of Teacher Training

From Table 8, we find that the ratio of teachers who think NTTP training is "effective" or "very effective" is 75 percent (see rows 3–4 column 1 of Table 8). Although this

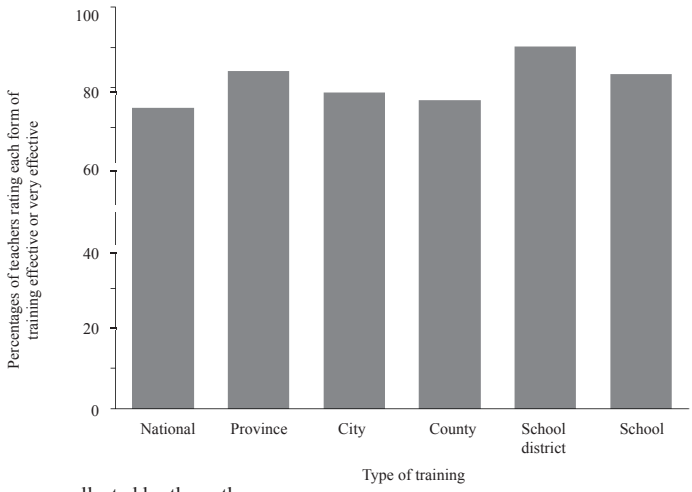
Table 8. Teacher Subjective Rating on Effectiveness of Teacher Training in Different Levels in China, 2013

Whether it is effective for you to participate in this training activity	Proportion of teachers selecting this option					
	National	Province	City	County	School district	School
No effect (%)	7.1	0.0	3.0	0.0	3.2	2.1
Little effect (%)	17.9	15.8	18.2	23.2	6.5	14.6
Effective (%)	46.4	36.8	60.6	51.8	58.1	58.3
Very effective (%)	28.6	47.4	18.2	25.0	32.3	25.0
Number of observations	28	19	33	56	31	48

Source: Data were collected by the authors.

Note: A school district usually includes one or several schools. In principle, students are required to study in the school district near to their home.

Figure 1. Subjective Evaluations of Teachers on Different Types of Teacher Training in China, 2013



Source: Data were collected by the authors.

Note: A school district usually includes one or several schools. In principle, students are required to study in the school district near to their home.

satisfaction rating is high, it is lower than all other forms of training (see Figure 1). Our findings suggest that teachers are most satisfied with the training provided by school districts (90 percent of teachers rated the training as"effective" or "very effective"). In addition, province and school training also receive high evaluation scores, as the proportion of teachers who rated this training as "effective" or "very effective" are 84 and 83 percent, respectively. A relatively small proportion of teachers rate city-level teacher training to be "effective" or "very effective" (79 percent), but this is still higher than for the NTTP training.

Likewise, the ratio of principals who view national teacher training as "effective" or

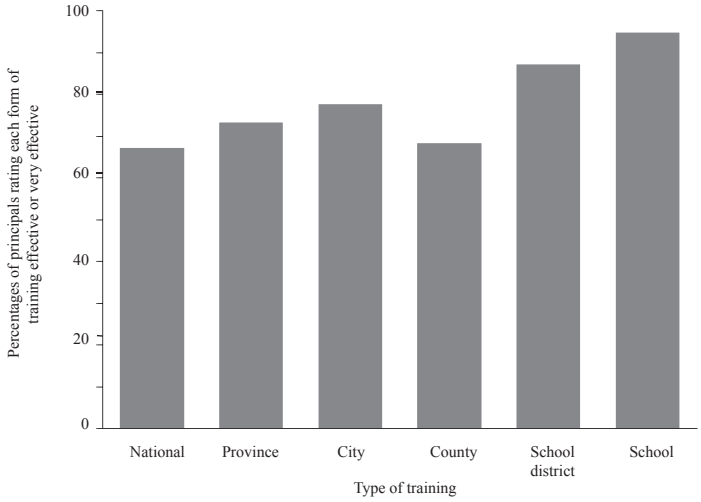
Table 9. Principal's Subjective Rating on Effectiveness of Teacher Training in Different Levels in China, 2013

Whether it is effective for your school to participate in this training activities	Proportion of principals selecting this option					
	National	Province	City	County	School district	School
No effect (%)	1.8	2.2	0.0	1.6	0.0	0.0
Little effect (%)	30.9	24.4	22.4	30.2	12.8	5.2
Effective (%)	47.3	46.7	55.2	44.4	53.8	63.8
Very effective (%)	20.0	26.7	22.4	23.8	33.3	31.0
Number of observations	28	19	33	56	31	48

Source: Data were collected by the authors.

Note: A school district usually includes one or several schools. In principle, students are required to study in the school district near to their home.

Figure 2. Subjective Evaluations of Principals on Different Types of Teacher Training in China, 2013



Source: Data were collected by the authors.

Note: A school district usually includes one or several schools. In principle, students are required to study in the school district near to their home.

"very effective" is only 67.3 percent (see rows 3–4, column 1 of Table 9), which is lower than other forms of training (see rows 3–4, column 1–6 of Table 9 and Figure 2). School training accounts for the highest proportion of "effective" or "very effective" principal satisfaction ratings (95 percent), followed by school district training (87 percent). The proportion of principals that perceive city-level (78 percent), province-level (73 percent) and county-level training (68 percent) as "effective" or "very effective" is not particularly high, although still higher than that of national teacher training.

These findings indicate that although the NTTP is the most expensive form of training, it is not really effective compared with other forms of teacher training. This suggests that the way in which the NTTP is currently implemented may not represent the most efficient use of resources, and training implemented at lower levels of administration might be more effective.

IV. Conclusions

The intent of our study is to provide insight into the current teacher training situation in China. Specifically, we report on the availability of teacher training, both in terms of the NTTP and other forms of training, we evaluate the types of teachers attending NTTP on-

site training, and discuss our findings on the training content provided. In addition, we examine the ways in which teacher training is delivered and determine the subjective evaluations of principals/teachers on different types of teacher training.

We find that more than 80 percent of teachers in China receive some form of teacher training. NTTP training provides the most training hours, but the majority of teachers attending NTTP participate in online rather than on-site training. Although it is consistent with policy mandates, we do not know to what extent online training can improve teacher quality. Other studies find that only a small percentage of teachers (generally lower than 25 percent) view online training as an effective training approach (Luo *et al*., 2013; He and Chen, 2014).

We also learned that NTTP training deviates from the official policy objectives in several dimensions. First, the subjects taught within training programs are not fully compliant with policy. Second, although we found that the trainees are mainly junior high school teachers from rural areas, the training opportunities are offered to a smaller proportion of rural teachers than urban teachers. Third, while the government has detailed requirements for the content and structure of training content, in practice, training content does not fully meet the provisions of policy. The existence of these compliance problems suggests that the way the NTTP is currently implemented is inconsistent with the objective of improving the quality of teachers, especially China's rural teachers.

Our research also provided information on how teacher training is provided. Although training is offered in a variety of locations, the vast majority of training is provided on college campuses. In addition, many classes are taught by college professors who may teach at too theoretical a level for rural teachers. It is also observed that instructors rarely communicated with each other about course content and structure. This lack of communication may inhibit trainees from studying pedagogy and content knowledge systematically.

Finally, we find that although the Chinese Government has invested heavily in national training, teachers and principals give national teacher training a lower evaluation than other types of training. In the future, it may be necessary for government administrative departments and the training institutions to evaluate the needs of teachers to better design training courses.

The inefficiencies in the current implementation of China's NTTP raise concerns as to the country's future human capital growth. Students in rural areas of China have fallen behind those in urban areas in terms of both quantity and quality of education received. If this situation is not mediated, it might restrict the current and future development of human capital in China. Although our research has uncovered many deficiencies in

the current teacher training administration, teacher training is still essential to improve the quality of Chinese teachers. The findings of our study suggest that future NTTP policy should focus not only on designing programs that can improve teacher quality, but also ensuring that program implementation is conducted in a manner that can help achieve program objectives. Specifically, we believe that there should be more focus on providing training opportunities to a larger proportion of rural teachers, increasing the communication and lesson coherence between NTTP trainers, and ensuring that actual lesson content follows policy mandates. Improved monitoring of NTTP implementation could help diminish the prevalence of program shortfalls and provide evidence that can help inform future policy determination.

We believe our study can make a significant contribution to the literature on teacher training within China, in particular because we use four diverse datasets to examine the current state of implementation of the NTTP and other forms of teacher training. However, our study still faces several limitations. Because our data are only from Shaanxi Province, they may not represent all rural areas of China. Therefore, further research on the situation of teachers' training in more provinces would be helpful for evaluating the effectiveness of the NTTP and other forms of teacher training.

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(Edited by Zhinan Zhang)