

The effect of inclusive teacher education course based on Service-Learning on student teacher's Attitudes towards disabilities

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Abstract: Contact theory (Allport, 1954) served as the framework to investigate student teachers' attitudes towards disabilities after a service-learning (SL) experience. 75 student teachers enrolled in the study to analysis the effect of an inclusive teacher education (ITE) course which included knowledge learning part (26 class hours) and service activity part(4 class hours).50 students served as the experimental group, in which 25 students finished the knowledge learning and attended the SL project by interview 9 group friends with disabilities (SLG), 25 students have only the information education (IEG); and other 25 students enrolled in control group, which no knowledge learning or service activity. The Scale of Attitudes toward Disabled Persons (SADP)-Chinese version and IAT were administered at two different times: before, and after the SL project. A mixed-design ANOVA revealed, compared with the CG, the implicit and explicit negative attitudes of the students in the SLG towards the disabled have been significantly changed; the knowledge learning part of ITE helps to improve the implicit attitudes of student teachers towards the disabled, and the part of service activities promotes a significant change in the explicit attitudes of student teachers towards the disabled. The results suggest that the quantity and quality of contact time with people with disabilities may be important to consider when designing and structuring SL experiences in teacher education courses.

Key words: Service learning, inclusive teacher education, attitude towards disabilities, student teacher

I. Introduction

According the of Intergroup Contact Theory Originated by Allport (1954), which asserts that interpersonal interaction is one of the most effective ways to decrease prejudice between minority and majority populations. Contact is considered important to reduce individual biases and stereotypical attitudes toward minority populations, including individuals with AIDS (Werth & Lord, 1992), the elderly (Drew, 1998), and individuals with disabilities (Slininger, Sherrill, & Jankowski, 2000). As for the effects about contact on the attitude towards disabilities, there is not exactly the same result. Researchers have found that those who have contact with individuals with disabilities generally hold more favorable attitudes toward individuals with disabilities than those who do not (Slininger et al., 2000). But Tripp et al. (1995) compared attitudes of students (ages 9-12 years) without disabilities who either had or did not have direct contact with peers with disabilities in their general physical education classes. Using the Peer Attitudes Toward the Handicapped Scale (Bagley & Green, 1981), results revealed that contact with students with disabilities did not significantly affect the attitudes of students without disabilities. Research has shown that the effects of attitude change depend on a host of individual and situational factors (Petty et al, 1998).

The Strategic options for influencing public attitudes towards people with disabilities was proposed by researchers: 1) contact with people with disabilities, 2) giving information and 3) providing experiential learning opportunities as three major ways for changing public attitudes to disability (Reidy,1999;The NDA Report ,2004). In reducing the negative attitudes, the most promising way is not to adopt a single strategy, but to combine and apply several strategies at the same time. It is worth noting that the strategy bombinated information and contact experience

of persons with disabilities plays an important role in attitude intervention(Lindsay & Edwards,2013), which named Service-learning, originated in the 1970s in the United States, is recognized as an effective teaching method in modern education field(姚梅林, 郭芳芳,2015; Kenworthy-U'Ren,2008). Reviewing the literature on service learning and attitudes towards disabled people, relatively few researchers have examined the attitudes that students majoring in teacher education hold toward individuals with disabilities (Bekirogullari, Soy Turk,&Gulsen,2011). Roper and Santiago (2014) taken the grounded theory approach to analysis the reflective diaries and interviews of 14 undergraduate(9 female students and 5 male students) enrolled in the SL project for P-12 students with disabilities, it was found that all participants shared their experience indicated that the SL experience positively affected their attitude towards individuals with disabilities. Although several studies have also failed to clearly identify the specific method of experiential learning used (e.g., SL, practicum, clinical placement) (Hodge et al., 2002). this SL project of the ITE course was design to provide student teachers opportunity to contact with the disabled directly according carefully planned SL activity, to improve quality of individual knowledge elaboration, make good preparation for their future include children with disabilities in regular classes.

In mainland of China, there are only 4 literature reviews(马婷, 徐钟庚, 张锋,2012; 房辉, 李静, 臧渝梨, 等.2016, 杨勇, 韩布新.2017,王雪梅, 2018) on the researches about attitude of the disabled, and few studies on attitude intervention(刘峰, 张国礼,2017;马婷, 徐钟庚, 叶莉芳,等2014, 琚四化, 徐琴,2017). Service learning, as a new teaching method, has not yet been vitrificated in the research area of the attitude of disabled people. Only one study 王臣,姚梅林,黎玉兰等(2014)regard service learning as an intervention and discuss the role in the background of inclusive and isolative education for the students with special education needs (SEN), there is no detailed function analysis on the knowledge learning part and service activity part within SL, and it lack of the discuss about how the SL influence the attitude process towards disabled people.

For the purpose of this study, an attitude is defined as "an individual's viewpoint or disposition toward a particular 'object' (a person, a thing, an idea, etc.)" (Gall, Borg, & Gall, 1996, p. 273).we conducted rigorous experimental study to check different treatment (information education group(IEG), service-learning group(SLG) and control group(CG)) on student teachers' attitudes at different time(the knowledge learning part finished and service activity part finished) ,employing a grounded theory approach, SADP and IAT to examine the influence of SL and the two parts of SL on student teachers' explicit and implicit attitudes toward people with disabilities. More specifically, we examined the following research questions:(1) How were student teachers' implicit and explicit attitudes toward people with disabilities affected by participation in the ITE based on SL? (2) What is the role of knowledge learning part on the implicit and explicit attitudes towards disabilities, and the role of service activities part? (3) What did the student teachers "gain" from the SL experience?

2. Research methods

2.1 Subject selection

Recruitment of all participants from A Normal University from March to July 2016 by extra-curricular credit. The IEG was recruited from 121 Sophomores major in pre-school education, and SLG come from 45 Sophomores major in primary school education, both groups enrolled the same ITE course named "Development and Education of Special Children". The CG was also recruited in the same grade majoring in pre-school education, but they selected the Art courses at the same time. the first author carried two class course teaching and organized one service activity for the students major in primary school education. In the end, we selected 75 subjects who finished the pre and posttests, there were 25 participants in each group. All the subjects were female, aged between 19 and 21.

2.2 experimental design

A real control experiment was designed to measure student teachers' explicit and implicit attitudes toward the disabled through the pre-test and post-test. There are 3 groups accepted the different education treatment happened on the natural class of ITE, IEG(30 CH of knowledge learning in classroom by traditional teaching method), SLG (26 CH knowledge learning in classroom by flipping the classroom and 4CH activity of SL), and the CG (no special education knowledge learning, no service learning activities either), as shown in Table 1. Before and after the attitude tests, the SLG and the IEG has finished the same knowledge module1-7, the detailed module theme and content was shown in appendix A, the focus is the Information Education Group(IEG) used traditional teacher-centered teaching mode, but SLG taken the flipped class teaching mode, Flip classroom mainly refers to the teaching method of discussion and problem solving in the classroom, in which students learn the videos provided by teachers through the network platform before class based on modern information technology(王鉴, 2016).

Table 1 the research design and schedule of three group

Schedule Research design	Weeks 1-10	Pre-test	Week11-12	Post-test	Week13-15
SLG By Flipped class	Knowledge learning M1-7	attitude measurement	Service activity part By interview 9 group people with disability	attitude measurement	Knowledge learning M8
IEG By Traditional Teaching	Knowledge learning M1-7	SADP+IAT	“Sensory Integration” theory and individual training	SADP+IAT	Knowledge learning M8
CG	none		none		none

2.3 Service-learning project in ITE

According Service-Learning principle(黄孔雀), we arranged the course schedule for two parts, the Knowledge Learning (KL)part and Service Activity (SA) part.

2.3.2.1 The "Knowledge Learning(KL)" Part

ITE is an Elective course for preschool and primary education majors of teacher education in our college. The undergraduate students were required to understand the individual differences and special educational needs of children, educational evaluation and inclusive placement, and grasp the psychological development characteristics and educational methods of several kinds of special children, such as autism, mental retardation, and week children and so on. the detailed 8 modules themes of ITE was shown in appedix1. which 2 credits and 30 Class Hours (CH). Each module has its unique practical skills exercises after the presentation of theoretical knowledge.

2.3.2.2 The “Service Activities(SA)” part

Generally, the practice of SL activities include preparation, implementation, reflection and celebration(黄孔雀,2014). The SA part was defined as theme with "the world is wonderful because of me", the interview survey the real life and situation of disabled people in their families or work units, which organized by teacher and groups of Student teachers involved. The objective of SA is to understand and apply the theory and knowledge of knowledge learning to the interview process of different types of disabled friends, choose the appropriate behavior and polite interpersonal communication methods to solve specific problems in the interaction.

(1) Preparatory section

Before interview, preparations were made in three ways: 1) recruiting student teachers to participate in interviews with the disabled, and dividing them into nine groups, about 4-5 people in each group; 2) except two groups voluntarily to find disabled friends independently, seven groups are interviewed by teachers' assistant with the Local

Disabled Federation community organizations. By the basic information of the disabled and interview place, there are nine groups of disabled persons were: 5 physically handicapped persons (3 male and 6 female, 23-56 years old); 1 hearing-impaired person (male, 46 years old); 1 visually impaired friend (female, 50 years old) 5 teenagers with Mentally Handicapped (3 male and 2 female, 13-16 years old); 1 autistic child (male, 12 years old, accompanied by his parents.); 3) To clarify the specific jobs to do, and prevent accidents, teacher organized a psychological construction discussion in the class, each group need to formulate an detailed schedule and interview outline, the telephone reservation, the specific and polite interview questions, and talking and sharing the anxiety and possible difficulties in group before the interview with the disabilities.

(2) Implementing section

Each group of student teachers interviewed the disabled separately in 30-50 minutes, under the consent of disabled friends, each group was asked to collect videos or sounds of the interviews, and edited five-minute video for presentation in the next class.

(3) Reflections section

A reflective diary about the service-learning activities for every participant need to submit more than 200 words after the interview.

(4) Celebration section

Together with their family company, there are 21 friends with disabled attending the celebratory and Summary of Course Report in the University classroom, the director of the college was invited to listen each groups' elaborated reports and interview videos, the first author as the class teacher made the summary and insight about SL, which won unanimous support and approval from disabled friends.

2.4 Research Procedures

The questionnaire and experiment were conducted by participants who provide informed consent. The pre-test time is done before SL activity (after the 10th week of knowledge learning) and the post-test time is done after SL celebration (after the 12th week of knowledge learning). In order to balance the sequential effects of explicit and implicit experiments, half of the subjects filled in the explicit attitude questionnaire before the implicit IAT test, and the other half did the implicit IAT test before the explicit attitude questionnaire.

2.5 Instrumentation

2.5.1 Implicit Association Test-IAT Experimental Procedure

Implicit Attitude Test (IAT) was constructed to calculate the latency of participants' responses when pressing a key on the keyboard to associate stimulus words, Greenwald, Nosek and Banaji (2003). 7-block sequence as Classical Research Paradigm is programmed to record the reaction time and correct rate automatically by E-prime 2.0. The experiment was presented by HP computer with 16 inch display and Windows 7 operating system. The screen resolution was 1366 *768. In the experiment, the stimulation rendering time was 250 ms, and the reaction time ranged from 300 ms to 10 000 ms.

In order to assure that the quality of descriptive words (i.e., stimulus items), we used the vocabulary pool from 陈光华等人(2012) attitude towards disability. target-concept includes disabled people and athletes. Attribute-concept includes negative and positive vocabulary. There are 8 words in each category, total 32 words. The details are as follows:

Persons with disabilities: hearing disabilities, visual disabilities, intellectual disabilities, amputees, language disabilities, cerebral palsy, polio patients, schizophrenia patients;

athletes: badminton players, basketball players, football players, track and field athletes, gymnasts, judo

players, tennis players, table tennis players;

“pleasant” terms: strong, outstanding, diligent Greatness, excellence, optimism, hard work, glory;

“unpleasant” terms: cynicism, bad, dirty, evil, cumbersome, lazy, humble, foolish.

2.5.2 Explicit Attitude Measurement: Public Attitudes towards Disabled Persons Scale

The Scale of Attitudes toward Disabled Persons (SADP) consists of 24 items with values ranging from -3 (I disagree very much.) to +3 (I agree very much), and no neutral point on the scale. High scores are interpreted to represent acceptance of individuals with disabilities, or a favorable attitude toward individuals with disabilities, and low scores represent an unfavorable attitude toward individuals with disabilities. The original factor analysis of the SADP supported a three-factor solution (Antonak, 1982). These three factors or subscales were Optimism, Misconceptions, and Hopelessness. The reliability of the original scale was reported to range from .81 to .85 (Antonek & Livneh, 1988).

In the present study, the 19 item SADP-Chinese version was revised by 郑曦 (2005), the alpha coefficients for the optimism-human rights(O-R), behavior-misconceptions(B-M), and pessimism-hopelessness (P-H) with reliability coefficients ranging from 0.651 to 0.732, and alpha coefficient homogeneity indices ranging from 0.776 to 0.801. Appendix B includes several questions from the SADP Chinese version.

2.5.3 Data Processing

(1) Implicit attitude- IAT

Participants' latencies of response to all stimulus words as well as their errors were saved to a log file on the host computer for each session and with a unique identifier to map the IAT data to a participant's demographic information. From the latency data, the researcher derived a *D*-score for each participant according to conventions established by Greenwald, Nosek and Banaji (2003). Those researchers recommended the IAT be scored in the following sequence:

1. Delete trials greater than 10,000 milliseconds
2. Delete subjects for whom more than 10% of trials have latency less than 300 milliseconds
3. Compute the “inclusive” standard deviation for all trials in Stages 3 and 6 and likewise for all trials in Stages 4 and 7.
4. Compute the mean latency for responses for each of Stages 3, 4, 6, and 7.
5. Compute the two mean differences (MeanStage6 - MeanStage3) and (MeanStage7 - MeanStage4).
6. Divide each difference score by its associated “inclusive” standard deviation
7. D = the average of the two resulting scores derived in step 6.

The value for a *D*-score is expressed in positive or negative terms, depending on whether the implicit association is favorable or unfavorable for one concept compared against another. The *D*-score is most often interpreted like an effect size of implicit preference. For purposes only of informing test-takers of potential implicit bias, scores between 0.15 and 0.35 have been described as representing a “slight” preference for one concept versus another; scores in the range between 0.35 and 0.65 reflect a “moderate” preference; and scores of 0.65 and above are indicative of a “strong” preference Greenwald, Nosek, and Banaji (2003).

(2) Explicit attitude questionnaires -SADP Chinese version

The scores of explicit attitude questionnaires are reversed for some subjects, and then the scores of each factor and total scale are calculated. In order to avoid negative values, total scale scores are processed by adding 57 points.

(3) Qualitative data collection and analysis by Grounded Theory

There are 9 SL group leader's reflective diaries (about 7423 words) were transcribed into TXT format verbatim and input the computer to analysis by Nvivo 11.0. which is a qualitative analysis software developed by QSR

company. Based on the procedures outlined by Strauss and Corbin (1998) for open, axial, and selective coding, all authors read each transcript thoroughly to get a sense of the whole and then inductively analyzed, an initial set of codes from the collected data was independently developed by each researcher, the initial set of codes was compared and discussed by the two researchers, then We have sorted 165 free nodes; The process of "coding the codes," 165 open codes put together in new ways as researchers seek to identify meaningful relationships between the themes and subthemes, discussion ensued between the researchers until consensus was obtained. This process of axial coding (Strauss & Corbin, 1998) involves generating connections among the themes and subthemes to understand the phenomenon. according the concept of the attitude, there are three level of attitude, the cognitive, emotional and behavioral, then we summarize the experience of Student teachers' attitudes towards the disabled, forming three sub-themes: A simple and optimistic cognition, positive and admirable emotion, and non-discriminatory behavior. During selective coding, these previously identified themes and concepts are further defined, developed, and refined and then brought together to tell a larger story. During this process, we set up four clusters according to the activity arrangement of SL, namely preparation stage, implementation stage, reflection stage and celebration stage. More explanatory topics shown in table 5.

2.6 Statistical Method

What subject's response on SADP Chinese version were manually entered into SPSS Version 20.0 for statistical analysis, descriptive analysis, paired sample t test, variance analysis and correlation analysis. A 3×2 mixed-design ANOVA was performed to determine the effects of SL on the attitudes of student teachers toward disabilities. The alpha p value was set at .05 as the acceptable level of significance.

3. Results

3.1 The influence of ITE based on SL on implicit attitudes towards disabilities

Firstly, in order to explore the effect of ITE based SL on implicit attitudes, we compared the D of three groups in post-test ($F=18.867$, $P < 0.001$), contrast with CG without no any contact with disabilities, the implicit attitude of SLG and IEG is significant improved ($I_{SLG-J_{CG}} = -0.168$, $P < 0.001$, $I_{IEG-J_{CG}} = -0.187$, $P < 0.001$), but there is no difference between SLG and IEG ($I_{SLG-J_{IEG}} = 0.018$, $P > 0.05$). This shows that the ITE based SL have greatly improved the implicit attitude of student teachers towards the disabled. The results are shown in Table 2.

Table 2 MNOVA of three groups' implicit attitudes towards the disabled on pre and posttests ($M \pm SD$)

time	Task type	SLG	IEG	CG	F
pretest	comp	600.0 ± 234.69	663.4 ± 222.37	703.81 ± 269.78	1.158
	Incomp	979.89 ± 389.78	856.0 ± 219.56	1195.95 ± 433.3	5.723**
	D	0.19 ± 0.13	0.20 ± 0.09	0.36 ± 0.15	13.702***
Post-test	comp	548.96 ± 228.45	551.5 ± 168.83	577.1 ± 115.02	0.193
	Incomp	824.42 ± 158.43	850.5 ± 267.27	1141.4 ± 250.18	14.594***
	D	0.18 ± 0.12	0.16 ± 0.12	0.34 ± 0.12	18.867***

** $P < 0.01$ *** $P < 0.001$

Secondly, in order to explore the effect of KL on implicit attitudes of disabled people, D score of implicit attitudes of three groups in pre-test were compared. The results showed that there were significant differences among the groups ($F = 13.702$, $P < 0.001$); among them, there was no significant difference between SLG and IEG ($I_{SLG-J_{CG}} = 0.01$, $P > 0.05$). However, compared with the CG, the D of the SLG and the IEG was significant ($I_{CG} - J_{SLG} =$

0.159, $P < 0.001$; $I_{CG} - J_{IEG} = 0.169$, $P < 0.001$). This shows that, compared with CG, the students (both SLG and IEG) who completed 20 CH information education showed implicit negative attitude towards the disabled, which indicating that knowledge learning can be helpful to improve implicit negative attitude of Student teachers.

Finally, we explore the role of SA part on implicit attitudes towards disabled people in Table 4, the comparison between SLG and IEG was no significant change in the implicit attitudes in the Independent sample T test ($t_{pre-test} = 0.310$, $P > 0.05$; $t_{post-test} = 0.548$, $P > 0.05$), and in the paired sample T test of ($t_{SLG} = 0.520$, $P > 0.05$; $t_{IEG} = 1.374$, $P > 0.05$). This shows that one short-time contact with the disabled is helpless to change the negative implicit attitude significantly.

3.2 The influence of ITE based on SL on implicit attitudes towards disabilities

In order to explore the effect of ITE based on SL on the explicit attitude towards the disabled, the post-test data of three groups were compared ($F_{SADP} = 4.423$, $P < 0.05$; $F_{O-R} = 3.358$, $P < 0.05$; $F_{P-H} = 3.284$, $P < 0.05$). The results are shown in Table3. On the total score of SADP, the SLG made significant differences than CG ($I_{SLG-J_{CG}} = 6.684$, $P < 0.05$) and IEG ($I_{SLG-J_{IEG}} = 9.491$, $P < 0.01$), but no difference between IEG and CG ($I_{IEG-J_{CG}} = 2.806$, $P > 0.05$). This shows that the SA as the direct contact strategy is useful to improves the explicit attitude towards the disabled, especially changed the factor of optimism-human rights, pessimism-hopelessness.

Table 3 MNOVA of three groups' explicit attitudes towards the disabled on pre and posttests (M±SD)

Group	Factor score	SLG	IEG	CG	F
pretest	O-R	32.60±5.89	31.36±4.45	33.46±4.59	0.574
	B-M	24.71±5.19	24.46±4.29	24.44±4.34	1.103
	P-H	28.0±3.69	26.48±4.43	26.52±4.52	0.025
	T _{SADP}	85.31±11.47	82.31±10.37	84.42±8.46	1.049
post-test	O-R	34.36±5.93	29.24±7.72	32.00±7.21	3.358*
	B-M	26.37±5.63	24.92±4.69	23.28±5.09	2.252
	P-H	28.80±3.42	25.88±4.39	27.56±4.24	3.284*
	T _{SADP}	89.53±11.30	80.04±12.27	82.85±11.17	4.423*

* $p < 0.05$

Secondly, the effect of KL part on explicit attitudes of disabled people was found no significant difference among the three groups' pretest comparison ($F = 1.049$, $P > 0.05$). Finally, Table4 showed the effect of before and after the SA part. In the paired sample T test of pre-test and post-test, the SADP total scores of the SLG was significantly increased ($t_{SLG} = -2.682$, $P < 0.01$); in the Independent T test of Post-test, the SADP total scores of the SLG were significantly higher than those of the IEG ($t_{inde} = 2.844$, $P < 0.01$), which showed that the short time SA changed the Student teachers' explicit attitude towards the disabled significantly.

Table 4 the pre-and post-test of the effect of SA on the SLG and IEG'S implicit and explicit attitude

		SLG	IEG	t_{inde}
pretest	D _{IAT}	0.19±0.13	0.20±0.09	0.310
	T _{SADP}	85.31±11.47	82.31±10.37	-0.971
post-test	D _{IAT}	0.18±0.12	0.16±0.12	-0.548
	T _{SADP}	89.53±11.30	80.04±12.27	2.844**
	t_{pair-D}	0.520	1.374	
	$t_{pair-SADP}$	-2.682**	0.842	

** $P < 0.01$

3.3 Qualitative Analysis of the “gain” Student teachers from the ITE based on SL

One of the purposes of this study was to qualitatively examine the subjective gain of student teachers about the influence of ITE based on SL. The following three themes will be extracted from Table 5.

3.3.1 Improving attitudes towards disabled people: "this is my first contact with disabled people, which is not sympathy as previously imagined, but respect, admiration."

Qualitative analysis found that there are significant changes on the attitude components before and after the SA. First of all, on the cognitive level, before the SA, student teachers *be afraid of inducing their discomfort if I asked his disabled history, those would be the sensitive and tough topics for them*. However, the close contact during interviews made us *recognizing the hardships and difficulties in the life of disabled people, and greatly impressed by their enthusiasm, sincerity and friendliness*. Which changed the cognition of the student teacher towards disabled, *they are full of positive energy, the world's sun and they have the simple and happy world*.

On the emotional level, before the SA, student teacher labeled the people with disability with “they”, and guessed that *they are self-enclosed, difficult to get along with*, and *After deep conversation with this aunt*, the appellation turned into “uncles” or “aunts”, *uncles and aunts are very optimistic at this time, not care if others look at them with a colorful glasses and feel inferior, back to the own safe area. We admire them very much*; on the behavioral level, student teachers began to voice for the social welfare of the disabled deserved: *Faced with the disabled, we should not look at the difference point, because they do not need compassion and sympathy, they need equality and respect!*.

Table 5 Third-level coding reference points and coverage

Activity arrangement	selective coding	axial coding	Open coding	Coverage rate (%)	Selective coding sort	
preparation stage	In the past, people with disabilities were hard to get along with	do not know about the disabled, no confident	7	4.24	3	
		can not find the people with disabled, fear that the disabled will not accept us	5	3.03		
		the type of disabled person in the Interview	8	4.85		
		Careful design and adequate preparation for service learning	Material preparation -outline of interview and presents	5		3.03
		Determine the interview place according the opinions of the disabled	6	3.64		
		Add total	31	18.79		
implementation stage	The enthusiasm, sincerity and friendliness of the disabled in interaction are unexpected	Passion of the Disabled	8	4.85	1	
		Friendship of the Disabled	6	3.64		
		The sincerity of the disabled	11	6.67		
		Experience the hard life of the disabled, we touched and	Cooperation of disabled friends during the easy or difficult interaction.	12		7.27

	admired	Understanding of people with disabilities increased in close interaction.	24	14.54	
		Add total	61	36.97	
reflection stage	Attitudes towards Disabled Persons improved	Full of positive energy, simple and happy	8	4.85	
		Positive, optimistic and admirable	5	3.03	
		Do not discriminate against the disabled	7	4.24	
	Understanding of Social Responsibility	Analyzing the reasons and putting forward constructive suggestions on self, family and the social welfare	7	4.24	2
		Pay attention to the disabled	9	5.45	
	Promotion of Professional Development	Collaboration Ability in Small Groups	2	1.21	
		Understanding and Reflection on Professional Knowledge	14	8.48	
	Reflections on Self and Love	Happy to help the disabled in need	4	2.43	
		Be a loving person by myself	4	2.43	
			Add total	60	36.36
celebration stage	SL is great and meaningful	Very meaningful	3	1.82	
		Experience well and profoundly	7	4.24	4
		Gain a lot	3	1.82	
		Add total	13	7.88	

3.3.2 understanding SL: "This interview activity is very meaningful and we have gained a lot."

SL is different from the traditional teaching mode of teacher-centered. It requires student teachers to go out of the classroom in bodies, face up to various social situations, study and think actively and solve problems independently. It is a challenge for student teachers who lack social experience, some student teachers' resist this at first. By qualitative analysis of the coding results, the reason for their resistance lies in they lacking contact experience with the disabled, *have never pay any attention to the disabled before, it is hard work to find the disabled*; lacking social communication skills with the heterogeneous population, *do not know how to communicate with the disabled, fear that the speech and behavior will be unacceptable by the disabled*; and some students are introverted personality *before going interview, I am very nervous, there are many worries, not confident, it could not be completed very well*. Therefore, the students teacher realized what they gain from the ITE based on SL were two important things, one is the teacher(the first author) have done great support and encouragement on the side of material and spiritual before SA, such as *helping to find the right friends with different disabled types* (hearing impairment, visual impairment, physical disability, intellectual disability, autism), to *provide a large number of online information about communication etiquette and matters needing attention on how to interact with disability, to discuss the outline of the interview with the each group members, and take the detailed examples to introduce myself on the phone or create*

the imitative situation to help students teacher find reasonable topic and way to express himself when he faced the disabled, which made my anxiety and resistance have reduced greatly.

The other factor is the unexpected enthusiasm of the disabled (*Uncle Chen is very enthusiastic to meet us at the subway entrance*), sincerity (*our questions are seriously answered*) and friendliness (*really open their hearts and want to be friends*). One group leader said that *I Enjoyed the process of communicating with the disabled and realized that SL is a meaningful activity, Although only a few hours together, but I got quite a lot, I believe that this interview will be great enlightenment to my future.*

3.3.3 Understanding love and social responsibility: "Be a loving and responsible person"

On the process to contact with the disabled, student teachers realized the meaning of their own lives (*we are all normal people, we should cherish everything in front of us, be a contented person is happy with what he has, do our best to help and care for those who need help, make my live meaningful, without regret!*). I have a new understanding of love and being loved (*this service activity has made me deeply feel the pure, kind, simple and simple love between people*). At the same time, some student teachers also reflect their insight about future teacher career (*as a future teacher, the most important thing is not how much professional knowledge I got, nor how many professional skills I got, but love, a love for children, which is the most important*), the understanding of pedagogical knowledge (*by this close contact with the disabled, we were able to apply the theoretical knowledge of special education to real practice, and had a deeper understanding about inclusive education;*). What is more interesting, student teachers understand the responsibility to be a member of citizens (*I think we should appeal to the whole society not to discriminate against the disabled, as long as you go to communicate with them, they are very friendly like your neighbor, they are very willing to become friends with us, we should extend your loving hands, the world will be more wonderful because of our friendliness*).

4. Discussion

4.1 The Implicit and explicit Attitudes towards Disabilities improved by ITE based on SL

By three groups' D score comparison in the post test, we defined ITE based on SL as a mixed direct and indirect contact strategy, which integrated KL part and SA part together, could improve the implicit and explicit attitudes towards disabilities significantly. Just like the contact theory explained, The KL part not only enables student teachers to grasp the relevant knowledge of cognitive and psychological development characteristics of different types of disabled children, but also can identify the causes and development pattern of disabilities clearly. In other word, the information education as an indirect contact helps student teachers to accept that disabled children have the same development trend as typical developmental children, and adopt a more objective approach to accept "disability", rather than assuming that all behavioral characteristics originate from their own traits; accordingly, the SA part provided student teachers direct contact experience, and turned the vague and negative image of the external group of disabilities into visualization and embodiment. These opportunities for intergroup contact have the potential to positively influence student teachers' attitudes toward individuals with disabilities, Same as Jenkins & Sheehy, 2009 found that service-learning projects are a natural fit within courses offered in our special education teacher training program, as an effective instructional strategy for teaching course content and social values. Which has a role to play in generating positive attitudes to disability in all participation's life including those of an interpersonal nature (Neeper & Dymond, 2012).

4.2 KL part has not improved the implicit attitudes towards disabled significantly

However, we did not find that the KL part and SA part has same effect on the implicit and explicit attitude towards disabled, though the "service" and "learning" in SL are equally important and indispensable (Darling-Hammond L, 1999). On the one hand, attitude is a cognitive, emotional and behavioral tendency acquired by individuals (Lewis R & Aiken, 2008), once formed, it is relatively difficult to be realized and to change easily by

individuals. Especially during five thousand years of history in China, the negative attitude towards the disabled hold the stigma effect has a long history, which increases the difficulty of SL. In the reflective diary, student teachers named “people with disabled” as “disabled peoples” (71 times), “disabled persons” (20 times), “vulnerable groups” (5 times) and “special groups” (5 times). The latter three appellations are negative terms (钟经华,2005), these words in the text actually reflects the long-standing negative stereotype on the disabled. It is very difficult for them to make positive changes in a short-time contact activity.

4.3 SA part have significantly improved the explicit attitudes towards disabled

After participating in SL, student teachers show more positive explicit attitudes towards disabled people, which is consistent with the results of Rillotta et al (2007). Increased contact would lead to a decrease in misconceptions and hopelessness and an increase in optimism related to individuals with disabilities. Allport (1954) believed that when one group lacked sufficient information or had wrong information about another group, there would be certain social prejudice. Inter-group contact provided an opportunity to obtain new information and clarify wrong information. Intergroup contact hypothesis holds that the positive role of intergroup contact only occurs under the following four key conditions: equality, common goals, teamwork, authority, legal or customary support. The short-time SA designed by this research meet these four principles and provide opportunities for student teachers take the direct contact with the disabled to verify the rationality of the theory. 9 groups contacted with disabled friends in an equal and relaxed atmosphere. during the course of ITE, every student teacher has received detailed and patient guidance from professional teachers. The common goal of the group is to master the knowledge related to disabled, experience their daily life. With the active cooperation of disabled friends, student teachers understand the hardships and difficulties of the life of the disabled, but also realize the efforts of the disabled groups and their families to overcome the difficulties. The admiration and affection compels student teachers to realize cognitive contradiction between the stereotype of the disabled (self-enclosed, difficult to get along with) and the positive orientation they have experienced personally. In order to restore the equilibrium state of the cognition, the participants have to change their negative attitudes towards the disabled. However, it should be noted that student teachers’ understanding of the disabled is insufficient, and the further knowledge learning and active engagement is necessary.

5. Conclusion

5.1 Compared with the CG without knowledge learning and service activities, the implicit and explicit attitudes towards disability of the SLG have been significantly changed.

5.2 The knowledge learning part of SL helps to improve the implicit attitudes of student teachers towards the disabled, and the part of service activities promotes a significant change in the explicit attitudes.

5.3 Qualitative research results show that effective participation in ITE based on SL project promotes student teachers to improve their attitudes towards the disabled, enhance their understanding of love, professional development and social responsibility.

6. Limitation and Enlightenment of Research

The first limitation is the Accuracy of the research design, although we have successfully embedded SL into our conceptual framework of the ITE, the knowledge learning part adopts information education-based intervention strategy (26 CH) and service activities adopt direct contact strategy (4 CH). we checked the effect of KL part(20 CH) and SA part (4CH) on the student teachers attitude towards disability.

secondly, due to the heavy professional work and programmed management of SL, the service activity part in SL is short-time and unsustainable, and the change of implicit attitudes has not achieved ideal state. Therefore, it is suggested that the intervention of negative attitudes towards disabled people in the future should increase the duration

of SL appropriately.

thirdly, implicit attitudes measurement tools used the original IAT experimental paradigm, there was the difficulty on the choose of stimulate items, the balance of compatible tasks and incompatible tasks appropriately. For example, the Simple Implicit Association Test (SC-IAT) proposed by Sriram and Greenwald (2009) and the conjoint Analysis Method introduced by Chan (2009) were used to solve the problems related to the traditional IAT. Similarly, the tool of explicit attitude measurement was appropriately revised by Zheng Xi (2005) more than ten years ago. Whether it is still suitable for the current public in China is still a question to be debated. Finally, the small sample size hinders the extension of this results. Future research should consider increasing sample size to provide more convincing evidence for the application of research results.

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Appendix A the course Module and class hours distribution of DESC

the Course Module and Class Hours Distribution of DESC

Module	Theme	Objectives and Contents	Activities and Places
M1	Individual differences and special children (2 CH)	To analyze the similarities and differences between the disabled and non-disabled, the appearance, personality, and lifestyle; understand the individual differences of disabled children	panel debate: can birth defects be blocked?
M2	Special Needs and Special Education (2 CH)	the concept cognition of special education, understand the relationship between special needs and special education	Group discussion: Can Xiangxiang Learning in regular classes (gardens)?
M3	Educational Placement and Evaluation (6 CH)	To Understand the placement forms of special children and master the methods of education evaluation	psychological Laboratory: Intelligence Testing and Early Screening of At-Risk Children
M4	Education for Children with Visually Impaired,CVI (4 CH)	To understand the definition, classification and causes of visual impairment, and master appropriate teaching strategies according to the development characteristics of CVI	Face to Face: Lecture on Disability Awareness from a couple with VI
M5	Education for Children with Hearing Impaired, CHI(4 CH)	To understand the definition, classification and causes of visual impairment, and master appropriate teaching strategies according to the development characteristics of CHI	Real Interaction: The Way to College for CHI
M6	Education for Children with Autistic Spectrum Disorder,CASD (6 CH)	To understand the definition and causes of autism, design the corresponding individualized teaching program according to the psychological and physiological characteristics of autistic children.	1.Inclusive Skills: Writing and Showing Social Stories 2.Sensory Integration Training Room: Introduction and Use of Sensory Integration Instruments
M7	Education for children with mental retardation,CMR (4 CH)	To understand the definition, classification and causes of intellectual disability, adapting curriculum and instruction according to developmental characteristics of CMR.	Service Learning project: The World's Wonderful for me: the Interview with Disabled Friends. Only for Primary Education Classes
M8	Education for Children with Physical Disabilities,CPD and weak Children,WC (2 CH)	to differentiate the concepts and causes of polio, cerebral palsy, epilepsy, asthma, and grasp the subtypes and characteristics of CPD and WC.	inclusive Skills: Problem Behavior Analysis and Positive Behavior Support
total	30 CH		

残疾人态度问卷

各位同学：

本问卷旨在了解您对残疾人的一般看法，请您就下面各项题目，提供宝贵意见，以利于研究残疾人的社会和教育问题！

一、基本资料 请在（）内填写您的答案代号或在__上打“√”

（ ）1 性别 1 男 2 女

（ ）2 年级 1 一年级 2 二年级 3 三年级 4 四年级 5 研究生

.....

二、填写说明及作答：

每题有六个选项，阅读后请在题后的数字（3，2，1，-1，-2，-3）上画圈以表示您同意或不同意的程度。

	完 全 同 意	很 同 意	有 点 同 意	有 点 不 同 意	很 不 同 意	完 全 不 同 意
1. 残疾孩子不应有接受义务教育的权利	3	2	1	-1	-2	-3
2. 残疾人没有能力承担道德责任	3	2	1	-1	-2	-3
3. 残疾人不应生育后代	3	2	1	-1	-2	-3
4. 应允许残疾人自由选择在哪里生活和怎样生活	3	2	1	-1	-2	-3
5. 残疾人康复治疗费用太高，无法实施	3	2	1	-1	-2	-3
6. 残疾人很多方面像小孩一样	3	2	1	-1	-2	-3

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