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Development and Validation of Tool for Assessment of Prospective Teachers' Professional 'Dispositions of Instructional Planning and Strategies' (DIPS).

Abstract *The present study aimed to develop and validate an instrument by employing quantitative measures for the assessment of prospective teachers' professional 'Dispositions of Instructional Planning and Strategies' (DIPS) in line with National Professional Standard for Teachers in Pakistan (NPST) developed by Ministry of Education (MoE) as policy guideline in the context of Pakistan. The instrument was employed to 424 prospective teachers in the Institute of Education and Research University of Punjab using stratified sampling with the representation of prospective teachers form all programs, semesters, and gender. Five dimensions of DIPS Scale namely, Critical Thinking and Multiple-ways of Problem Solving, Team Work and Cooperative Learning, Collaboration and Cooperation, Enabling Students for Independent Learning, Attainment of Curriculum Goals were identified. The Cronbach Alpha reliability of the instrument was found 0.8. The finding provides preliminary evidence of a valid and reliable tool for the pre-service teachers in Pakistan.*

Key Words: Dispositions, Instructional Planning and Strategies, Perceptions, Values, Commitment

Introduction

Quality education has no meaning without teacher quality. Teacher quality in one way or another relates to the personal and professional attributes of the teacher. There is consensus across the countries on what constitutes quality teaching and with the common practice of delineating standards to specify and assess teachers' quality and thus quality teaching. An overlap of standards has been found by Michelli and Eldridge (2017) while mapping standards for teachers. These standards for teachers include common components like knowledge, skills (competencies), and dispositions. Worldwide the focus of teachers' preparation standards has been expanded and emphasized on expectations of professional dispositions along with knowledge of content and pedagogy. (Johnston, Wilson & Almerico, 2018).

The importance of dispositions for teacher preparation and quality teaching was sought by Sockett (2009) in the history of teacher education. He found that in the late 1980s and 1990s teacher education was merely a scholarship, pre-occupied by only knowledge whereas in the last two decades the shift is noticeable towards the 'moral center' of teaching other than competencies. Although very few studies have not provided any proof of the relationship between dispositions and teachers' effectiveness (Hess, 2006). Also according to Storm (2015), the importance of dispositions for teacher quality and student learning is just hyperbole. A significant number of research studies indicated a strong relationship between learning/ achievement of students and his/ her dispositions (Taylor and Wasicsko, 2000). Also, there are certain pieces of evidence of the existence of a strong positive correlation between teachers' dispositions and quality of learning (Notar, Riley & Taylor, 2009), thus consensus has been built that dispositions of teachers matter a lot in endeavors of quality education (Sockett, 2012; Skarbet & Smith, 2013; Strom, Margolis & Polat, 2019).

Worldwide both the accreditation standards and standards for licensing and certification of teachers have assessed professional dispositions mandatory for the evaluation of teachers (Strom, Margolis, & Polat, 2019). Assessment of dispositions has been included by famous and commonly used teacher evaluation instruments as well (Marzano & Brown, 2009; Danielson, Axtell & McKay,

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2009).

Disposition and National Guidelines: Pakistani Context

There are two policy documents regarding teachers' quality assurance in Pakistan: National Standards for Accreditation of Teacher Education Programs (NSATEP) by National Accreditation Council for Teacher Education (NACTE) and National Professional Standards for Teachers (NPST) in Pakistan.

NACTE Pakistan has a mandate for quality assurance and enhancement of teacher education programs. The SATEP are the specified criteria for evaluation of pre-service teacher education programs and award of accreditation levels Z, Y, X, W where Z is the lowest level. One of the pre-requisite for the Z, the lowest level of accreditation, is the "curriculum is designed in line with the provision of national educational policies and national professional standards for teachers in Pakistan". (NACTE, 2009, p.3). Accreditation standards require teacher education programs to align their curriculum to developed and assess professional dispositions of the teacher defined in NPST.

NPST were developed by the Ministry of Education (MoE) in 2009 (Lister, Bano, Carr- Hill, & MacAuslan, 2010) by establishing the Teachers' licensing and certification system in Pakistan. These standards are meant to provide guidelines for teacher preparation and evaluation of the teacher's quality. The standards are ten (10) in numbers, whereas each has three components e.g., knowledge, skills & dispositions desired of the teacher (NPST,2009). The dispositions component of the fourth standard of 'Instruction Planning and Strategies (DIPS)' is the focus of the current study.

Both the standards for teachers and teacher education programs have been developed in light of international quality assurance practices as well as the consensus built by national experts in a local context. Thus the importance of dispositions assessment in Pakistan does not remain questionable.

In the present Pakistani context, there is a need for valid and reliable tools for assessment of teachers' dispositions particularly in alignment of NPST in Pakistan. These tools are needed for licensing and certification system as well as for teacher education institutions as a standpoint to further work and development of the tools. After launching of NPST, Directorate of Staff Development Authority (DSD) Punjab and Sindh Teacher Education Development Authority (STEDA) in Sindh tried to work on the assessment of teachers but no such system for certification likening has been reported till date. To address the above-stated problem and fill the gap, the study at hand aimed at developing a standardized instrument for the assessment of prospective teacher dispositions, based on a perceptual approach that can serve as a common thread among all diverse definitions. This will not only serve the teacher education programs but also can be adopted for figuring out teachers' licensing or registration mechanism. The objective of the present study is to develop and validate a scale for assessment of DIPS in line with NPST which is useful for an application on masses with less time and effort.

What Dispositions are?

Dispositions have not been clearly defined in the literature. In the work of John Dewy (1933), the notion of 'disposition' is reflective as "the body of habits of active dispositions which makes a man do what he does" (p.44) and knotted to mindful, reflective thinking. Since last decades, the definitions of dispositions can be found in the professional literature in the context of producing "good teacher" and "good teaching" with the ambiguity of what "good teacher do" and what "good teaching". More debate remains about the nature of dispositions whether static and inheritor can be manipulated or developed thus leading to questions if these are observable. (Strom, Margolis & Polat, 2019).

The first study on dispositions has been traced back to literature from the work of Arthur W. Combs in the 1960s on personal perceptions of effective helpers as mentioned by Whitsett, Roberson, Julian, & Beckham (2007). He used the term 'dispositions' and 'perceptions' interchangeably (Cummins & Asempapa, 2013). He added that an individual's behavior is the product of his perceptions, made through exposure over time. This related the dispositions to Dewey's notion of experiential learning from the 1930s and Kurt Lewin's field theory from the 1940s. (Smith, 2017; Bullough, 2019; Johnston, Wilson, & Almerico, 2018).

In the teacher education context, dispositions have been defined in many ways like beliefs, ethics, values, commitments, and attitudes. (Diez & Raths, 2007; Katz & Raths, 1985; Taylor & Wasicsko, 2000;

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Thompson, Ransdell, & Rousseau, 2005; Thornton, 2006). These are innate abilities (Taylor & Wasicsko, 2000), ways to behave (Katz & Raths, 1985; Ritchhart, 2002). Teachers' behavior is situational: depending upon the circumstance. These conducts are not automatic (Ritchhart, 2002 as cited in Diez & Raths, 2007), so these can be called habits of mind (Katz and Raths, 1985, as cited in Diez and Raths, 2007).

The term 'trait' to explain disposition has been negated by Diez and Raths (2007) as according to them for one trait certain behavior is associated with and thus gives a cloudy meaning to the concept of dispositions. Also, few traits are classified into introvert and others in extrovert. Although Freeman (2007) added that teachers with both types of traits can be effective either extrovert or introvert. The question remains to build on the consensus for further use of the dispositions in teacher education thus defining professional effectiveness linking with traits of a person is not helpful (Diez and Raths 2007).

Different definitions of teachers' dispositions have been categorized by Wasicsko, Callahan, and Wirtz (2004) into three categories as teachers' behavior, teachers' characteristics, and teachers' perceptions. A five-category distribution of the different definitions of dispositions was made by Thornton (2006). Others who also supported the idea of 'dispositions in action' thinking that dispositions are invisible so can be analyzed through behavior (Johnson & Reiman, 2007).

Teacher education program defines dispositions in variations like it may be simple to complex (Bradley & Jurchan, 2013), beliefs that all students have the ability to learn (Choi, Benson, & Shudak, 2016), ability to maintain equity while teaching children (Villegas, 2007), personality traits (Bair, 2017), 'equity awareness' (Williams, Edwards, Kuhel, & Lim, 2016, p. 23), character traits, such as integrity (Choi et al., 2016), a type of knowledge (Rodriguez, Monreal, & Howard, 2018), etc. According to Sockett (2009) dispositions are constituents of a group of virtues e.g: virtues of care, intellect, and characters.

Although various definitions were prevailing a consensus emerged (Honawar, 2008). The perceptual theory of dispositions seems to be a common theme in all different definitions of dispositions, as all include hazy words like thoughts, attitudes, values, beliefs, traits, and habits of mind, etc.

Perceptual Dispositions Model

The framework of the perceptual model of deposition is rooted in the theory Arthur W. Combs (Combs, 1949), psychologist/educator (1935-1999) on his work on dispositions of effective teachers. He investigated the dispositions of 'effective people' who have a significantly positive effect on others' lives (Richards, 2010). There are underlying concepts which constitute perceptual model e.g., people behavior depends on how the world appears to them, their behavior is reflective of their perceptions where perceptions are attitude, values, and believes. These attitudes beliefs and values (perceptions) are shaped in a lifetime. Now the behavior of individuals can be studied through their perceptions for themselves, the world, and the goals. Ultimately these perceptions are valid and reliable inferences of behaviors (Combs, Soper, Gooding, Benton, Dedrick, & Usher, 1969).

Afterward, in 40 years, others explored the implication of perceptual psychology and perceptual characteristics of effective teachers. Mark Wasicsko (Wasicsko, 2007), the student of Arthur W. Combs continued his work to date. The results of these studies encompass four types of perceptions as underlying the dispositions e.g., perceptions of self, perception of others, perception of goals (purpose of teaching), and perception of others. (Wasicsko, 2007; Wasicsko, Wirtz, & Resor, 2009; Allen, Wasicsko, & Chirichello, 2014).

Assessment of Dispositions

For assessment of teacher's disposition, three approaches are used as found in the literature review. The first approach is based on Marzano and Danielson framework based on for dispositions assessment (Alexander, 2016; Donahue, 2016; Graziano, 2016; Marzano, 2012; Quinn, 2014; Wilkins, 2017). The second approach is based teacher evaluation domains (Alexander, 2016; Quinn, 2014; Wilkins, 2017), whereas third is based on national standards (CCSSO, 2013; Klute, Apthorp, Harlacher, & Reale, 2017; Lang et al., 2018 a &b; Sargent, 2015) like in the USA the national criteria (standards)

by the Interstate Teacher Assessment and Support Consortium (InTASC)

Likewise, variation in approaches, there are several methods and tools for assessments of dispositions involving data quantitative, qualitative, or both in nature. The first known quantitative instruments: the Eastern Dispositions Index (ESTDI) and Teacher Dispositions Index (TDI) are based on INTASC have used the perceptual orientation of the dispositions and are valid and reliable (Cudahy et al., 2002; Schaffer, 2003). The present study is based on the approach of using national standards for teachers by using quantitative measures.

Framework for the Study

The study is based on a perceptual approach of disposition by pioneer Arthur W. Combs (Combs, 1949) as discussed earlier. In this context of approach, dispositions are individual's perceptions (Wasicsko, 1977 & 2007) where perceptions referred to beliefs, values, and attitudes (Waisko, 2007). "Attitudes are tendencies to react" (Anastasi & Urbina, 1997, P.419). Combs, Soper, Goodling, Benton, Dickman, & Usher (1969) have used in their studies the terms "dispositions" and "perceptions" identically.

Dispositions in NPST have been defined as beliefs, values, and attitudes of teachers' parallel to the concept of the perceptual approach of dispositions: perceptions about self, perception about others (learners) and the perception of the context (teaching-learning elements e.g., the purpose of teaching and general frame of reference constitute the context).

The believes, values and the attitudes are effects of the perceptions and thus predictive of teachers' professional behavior and commitment (Lodhi, 2014). The DIPS states that teachers "value and are committed" to, "attain goals and objectives of the curriculum they are going to teach, use multiple ways of problem-solving, development of the students critical thinking, independent problem solving and performance capabilities, pedagogy of care, collaboration, cooperation, teamwork, and cooperative learning". (NPST, 2009, p.12)

Method

In present study context, the assessment criteria' are pre-specified dispositions in standard four (4) of NPST. Moreover, the approach to assess disposition is being used depending upon the particular framework of study 'perceptions' has been taken as 'constituents' of dispositions, being as a basic, logical, and common thread supported by the literature. A quantitative approach, using survey design through self-report technique was chosen. A quantitative approach has also been used in many other studies to assess dispositions. (Keiser, 2005; Lambert, Curran, Prigge & Shorr 2005; Richordson & Onwegbuzie 2004; Wasicsko, Wirtz & Resor, 2009).

Sample

The sample is the group of people having a representative of all characteristics of the population under study (Gay, Mills, & Airasian, 2012). The study sampled 424 students of all nine (9) teacher education programs, in Institutes of Education (IER) the University of Punjab through stratified random sampling. The sample comprised of nearly 25-30 % of the total population as determined by using Krejcie and Morgan (1970) law.

Instrument Development

A group of experts who have been involved in the development of NPST in Pakistan and the SATEP, were consulted for their review on the assessment approach and broadening researcher viewpoint through an Expert Consultation Guideline (ECG) prepared by the researcher. Thus they were requested to give their feedback on two areas: one on the precision of logical rationale for the concept "perceptions as constituents of dispositions" (In this part they were asked questions if the approach is valid and asked for their comments for improvements) and second area was on alignment and accuracy of the content specified to assess/ describe DIPS specified in NPST (Table 1 includes a brief content about DIPS scale). The ECG was meant only the enhance the vision of the researcher. The consolidated responses supported the perceptual concept of dispositions and the technique to study

teachers' dispositions with minor reservations. The results of this tool have not directly been used in the study The questionnaire (scales) with six points Likert-type scale ranging from '0% agree/disagree' to '100% agree' in six levels with equal intervals of progressions was prepared. The results of data reduction (factor analysis) has been given in proceeding sessions.

Table 1. Descriptive Information for DIPS Scale and alignment with NPST

Name of Scales	Brief Description of Scales/ Content	NPST
DIPS Scale	PTs perceive their selves as committed to attain curriculum goals, make students learn critical thinking by using multiple ways of problem-solving, endorse cooperation and collaboration as they think that learners have the performance capabilities and can be made independent in learning. They think teaching method and ways can be	Standard-4 of Instructional Planning and Strategies modified for favorable use.

Development of Item Pool

For the development of the item pool, all dispositions were operationalized, by translating in an interrelated group of perceptions in three domains as specified in the framework of the study. The content specification was done keeping in view the statement of dispositions given in NPST. The items in the alignment of the content and scope were developed in light of the available practices. Initially, the tool included 44 items- some positive and some negatively worded- were further processed for refinement and validation.

Content validity of the scale related to the NPST: Expert Validation

To select and reject the items, the content validity of the scale was determined after defining the scope and development of the items pool. The first draft of items was presented to the group of 14 reviewers working in the field of education and associated with educational research in one way or another. They requested to give feedback on the alignment and accuracy of the content describing the scope of the dispositions in the standard understudy. Afterward, they were asked to rate each item whether it is essential, useful but not essential or unnecessary by considering its quality and relevance with an operational definition. On the basis of the rating analysis, items content validity ratio (CVR) and content validity index (CVI) of the scale were calculated. Finally, 31 items with content validity above 0.51 were retained and others were deleted. (Shultz & whitney , 2005). Table 2 shows the validity values.

Table 2. CVR & CVI Teacher's DIPS Scale

Item#	CVR	Item#	CVR	Item#	CVR
1	0.71	12	0.57	23	0.85
2	0.85	13	0.71	24	0.85
3	0.71	14	0.71	25	0.85
4	1.00	15	0.71	26	0.71
5	0.85	16	0.85	27	0.71
6	0.71	17	0.85	28	0.85
7	1.00	18	0.71	29	0.71
8	0.57	19	0.85	30	0.85
9	0.71	20	0.85	31	0.71
10	0.85	21	0.85		
11	0.71	22	0.71	CVI (DIPS)	0.77

Data Analysis

At the initial stage of analysis, data were screened scrutinized for cleaning and testing its normality. In the second phase, it was subjected to factor analysis.

Factor Analysis

On the second stage 31 DIPS were administered on 424 prospective teachers studying in different teacher education programs. To evaluate the dimensionality of the DIPS, exploratory factor analysis employing principle component analysis with varimax rotation was performed to explore underlying factors, for reason that the factors are not highly correlated (Field 2000).

To decide about the number of the factors, the scree plot was also examined along with the criterion of Eigenvalue greater than 1.00 as only Eigenvalue criterion could have resulted in misjudgment of the most of the appropriate number of factors (Grosuch, 1983) and this is the least accurate method as per consensus in the literature. (Velicer & Jackson, 1990). Therefore, data was run by setting the number of factors suggested by both the scree plot and the Eigen values: Based on Eigen values (absolute) and scree plots (relative Eigen values). Through comparison of rotated factor structure, cleanest, logically and conceptually best factor structure was selected, with item loadings above 0.30 with one exceptionality (see table 3), for the sake of content validity. Very few items with cross-loadings and no factors with fewer than three items were retained (Costello & Osborne 2005). Item reliability was estimated by using coefficient alpha (Crocker & Algina, 1986). The items with low or zero value of coefficient alpha were rejected and removed (Dinnel & Thompson, 2000; Dunn-Rankin, 1983: McIver & Carmines, 1981.

Factor Loading of DIPS Scale

The five factors structure was shown best fit to the data by the rotated matrix for content valid items. These five factors, dispositional components of instructional planning and strategies accounted 49.99 ~ 50 % of the variance. Factor loading is given in table 3. For sampling adequacy, value of Kaiser-Meyer-Olkin (KMO) was 0.833 which shows excellent Bartlett's Test of Sphericity (0.000) was statistically significant supporting the factorability. Items that were below 0.30 factor loading were deleted and finally, 22 items were selected.

In five-factor structure solution, factor 1 was consisted of seven (7) items and accounted for 21.62% variance. The items grouped in this variable were related with two aspects; teacher perception to teach students critical thinking skills and use of multiple ways to solve problems. Thus this factor was named critical thinking and multiple ways of problem-solving.

Factor 2 presented the theme of preference for 'teamwork and cooperative learning (TCL) and named after review of the grouped item under this factor. This factor explained 10.3% of the total variance and included 4 items.

Factor 3 with 6.9% of the variance and grouped five items, when reviewed the common theme was found as the teachers' perceptions of the importance of 'collaboration and cooperation' with students.

Factor 4 named as 'enabling students for independent learning' for the reason, the items were about to enable students for independent learning having three items and accounted for 5.5% of the total variance.

Factor 5 with three items, 5.4% of variance named as 'attainment of curriculum goals' with an exceptional item having less than 0.3 value of factor loading. This item was retained for the clear structure of the factor and content validity.

Table 3. Factor Loading for Exploratory Factor Analysis with Varimax Rotation of DIPS

S. No.	Item# in Piloting Tool	CTMPS	TWCL	CC	ESIL	ACG
1	19	.650	……..	……..	……..	……..
2	20	.632	……..	……..	……..	……..
3	18	.630	……..	……..	……..	……..
4	16	.535	……..	……..	……..	……..

S. No.	Item# in Piloting Tool	CTMPS	TWCL	CC	ESIL	ACG
5	17	.531	……..	……..	……..	……..
6	12b	.428	……..	……..	……..	……..
7	47	.369	……..	……..	……..	……..
8	78	……..	.771	……..	……..	……..
9	79	……..	.714	……..	……..	……..
10	56	……..	.673	……..	……..	……..
11	22	……..	.665	……..	……..	……..
12	51	……..	……..	.644	……..	……..
13	53	……..	……..	.639	……..	……..
14	55	……..	……..	.594	……..	……..
15	46	……..	……..	.586	……..	……..
16	54	……..	……..	.557	……..	……..
17	50	……..	……..	……..	.651	……..
18	52	……..	……..	……..	.607	……..
19	75	……..	……..	……..	.434	……..
20	71	……..	……..	……..	……..	.722
21	73	……..	……..	……..	……..	.706
22	72	……..	……..	……..	……..	.290[a]

Note. Factor loading >0.3 are in bold faces. Rotation coverage in 7 iterations. CTMPS=Critical Thinking and Multiple-ways of Problem Solving; TWCL=Team Work and Cooperative Learning; CC= Collaboration and Cooperation; ESIL= Enabling students for Independent Learning; ACG=Attainment of Curriculum Goals. [a]Item retained for the sake of content validity.

The correlation among factors DIPS Scale was calculated which is given in table 4. The value of correlation coefficient from 0.7 to 0.9, 0.4 to 0.6, and 0.1 to 0.3 indicates strong relationship, moderate, and week relationships respectively (Dancy, 2011). The independence of variables is evident by the weak and moderate correlation among variables.

Table 4. Correlation among Factors of DIPS Scale

	CTMPS	TWCL	CC	ESIL	ACG
CTMPS	1.00				
TWCL	0.31	1.00			
CC	0.20	0.08	1.00		
ESIL	0.45	0.30	0.11	1.00	
ACG	0.42	0.32	0.19	0.27	1.00

Note. CTMPS=Critical Thinking and Multiple-ways of Problem Solving; TWCL=Team Work and Cooperative Learning; CC= Collaboration and Cooperation; ESIL= Enabling Students for Independent Learning; ACG=Attainment of Curriculum Goals.

The brief about the comprehensive final Scale of DIPS is given in table 5. This shows all the factors, their relating item, and some sample items.

Table 5. Scope, Number of Items and Sample Items in DIPS Scale

Factors/Scales	Scope/ Frame work	No. of Items	α
Factors for DIPS			
CTMPS	Teaching the students skill of seeking and analyzing information independently by encouraging their curiosity and managing multiple ways of problem-solving.	7	0.78
TWCL	Making students learn doing team/ group work with cooperation among each other.	4	0.69
CC	Caring students and promoting teacher students' cooperation and collaboration.	5	0.79

Factors/Scales	Scope/ Frame work	No. of Items	α
ESIL	Enable the students doing independent tasks, manage the work on their own thus doing independent learning.	3	0.62
ACG	Making all possible efforts for attainment of the curriculum goals by targeting these goals in all the teaching-learning efforts	3	0.65
DIPS (Scale)		22	**0.8**

Note. Bold faces are to show the final pictures for reliably of the composite scales.

CTMPS=Critical Thinking and Multiple-ways of Problem Solving; TWCL=Team Work and Cooperative Learning; CC= Collaboration and Cooperation; ESIL= Enabling Students for Independent Learning; ACG=Attainment of Curriculum Goals

Concluding Remarks for Further Implications

No research is final as it gives a standpoint to further researches. The tool developed is based on data reduction under some defined phenomena. The factors of the tools, described by quantitative analysis are predictors of dispositions in NPST thus it may provide a guideline to teacher education institutions individually, researchers, and policymakers collectively to develop other tools in different variable contexts and enhance practical implications for future use.

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