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A Values, Skills and Knowledge Framework for Initial Teacher Preparation Programmes

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Abstract: The purpose of this paper is to introduce an integrated values, skills and knowledge (VSK) framework for initial teacher preparation programmes. The VSK framework articulated, in broad terms, the desired skills and knowledge components for beginning teachers, with the underlying core values permeating the programmes. The paper has two parts, the first of which details the development as well as the conceptual underpinning of the VSK framework. Part two, through a programme evaluation, discusses the validity and reliability of items developed through the VSK framework to measure the values, skills and knowledge that student teachers perceived through their initial teacher preparation programme.

Introduction

Rapid developments in education, both locally and globally, have raised questions about teacher education and the attributes which underpin proposed teacher preparation and professional development opportunities (Thorpe, 2002). There is a need to draw up descriptions of core attributes to provide teachers new to the field, and those responsible for training them, with clear goals and understanding of the role of a teacher. According to Hager and Gonczi (1993) the generic interpretation of competency centres on the crucial general attributes that an effective practitioner demonstrates and which may be transferable to other roles. A holistic perspective of attributes brings together a range of interpretations and allows for the incorporation of values, ethics and the need for reflective practice. This emphasizes an integrated approach which seeks to establish the relation between knowledge, skills and values.

Education and the challenges of preparing quality teachers are important priorities in many developing and developed countries; Singapore is no different. The success of what Singapore hopes to achieve in education depends on the quality of its teachers. Competent effective teachers help to build a strong system of education. The traditional role of the teacher at the centre of student learning is no longer adequate to meet these challenges. In 2004 the National Institute of Education (NIE), Singapore, reviewed and enhanced their pre-service programmes. The desired attributes of a beginning teacher were articulated and a *Values, Skills & Knowledge* (VSK) framework was developed.

The paper has two parts. The first details the development as well as the conceptual underpinning of the VSK framework. Part two, through a programme evaluation, looks at the validity and reliability of items developed through the VSK framework to measure the values,

skills and knowledge that student teachers perceived through their initial teacher preparation programme.

Part One

Development of the VSK framework

Competency frameworks attempt to make explicit a set of minimum and essential desired attributes of beginning teachers (NBPTS, 2002). These attributes are usually stated in ways that are demonstrable and assessable by the schools or university supervisors. They define the professional capabilities, provide benchmarks and serve as the basis for the design of teacher preparation programmes and ongoing teacher professional development. By ensuring quality of new teachers the framework, therefore, becomes a response to providing a means of quality assurance for teacher preparation.

It was important to re-focus teacher preparation as teacher "education" rather than teacher 'training', which has been used in the Singapore context for many years. Given this 'education' rather than 'training' focus, The National Institute of Education (NIE), Singapore conducted a comprehensive review and enhancement of initial teacher preparation programmes in 2004 and a framework articulating the desired attributes of a beginning teacher was developed. The review provided the opportunity to rethink concepts and terminologies. It focused on building capacities necessary for effective participation in professional learning communities and in evolving a strengthened model of teacher preparation. In developing the framework the following approaches were adopted.

"Expert consensus building" approach. Carefully selected groups of policy makers and professionals, both local and international, in teacher education were consulted. Expert knowledge was used to establish a consensus on quality indicators. These indicators were used to guide the review and enhancement of the initial teacher preparation programmes.

"Research-based" approach. An in-depth review of the recent literature on best practices and progressive models in teacher preparation and learning was conducted. This process provided the trends, issues and concerns in teacher education, such as in pedagogical content knowledge, foundational educational knowledge, teaching practice models, quality control and assessments.

"Professional consensus" approach. Main stakeholders (principals, Ministry of Education, faculty, student teachers) were consulted. School principals were also asked on the attributes they would like in beginning teachers. The Enhanced Performance Management System or EPMS, a tool designed to help education officers develop themselves professionally and improve their key competencies, was also consulted. The EPMS framework was rolled out for Singapore school management in 2003. It is a competency-based performance management system that spells out the knowledge and skills requirements as well as the professional characteristics (Ministry of Education, 2004).

The development of the VSK framework has been informed by a number of studies that focused on teacher quality, the changing nature of teachers' work and the new demands being placed on teachers. The VSK framework articulated, in broad terms, the desired skills and knowledge components for beginning teachers, with the underlying core values permeating the curriculum. Through the VSK framework the programmes are designed to emphasize inquiry, innovation, reflection, mutual respect, personal connection, collaboration and community. This conceptual framework builds on the strategies and pedagogies that will enable student teachers to

reflect on the values dimension of teaching and to develop the knowledge, values and skills necessary for inclusive practice, teaching and learning in Singapore schools. While each attribute highlights a certain aspect of professional practice, it is, however, important to recognize that the attributes overlap and are interdependent and interconnected. This also reflects the interrelated aspects of the teacher's work.

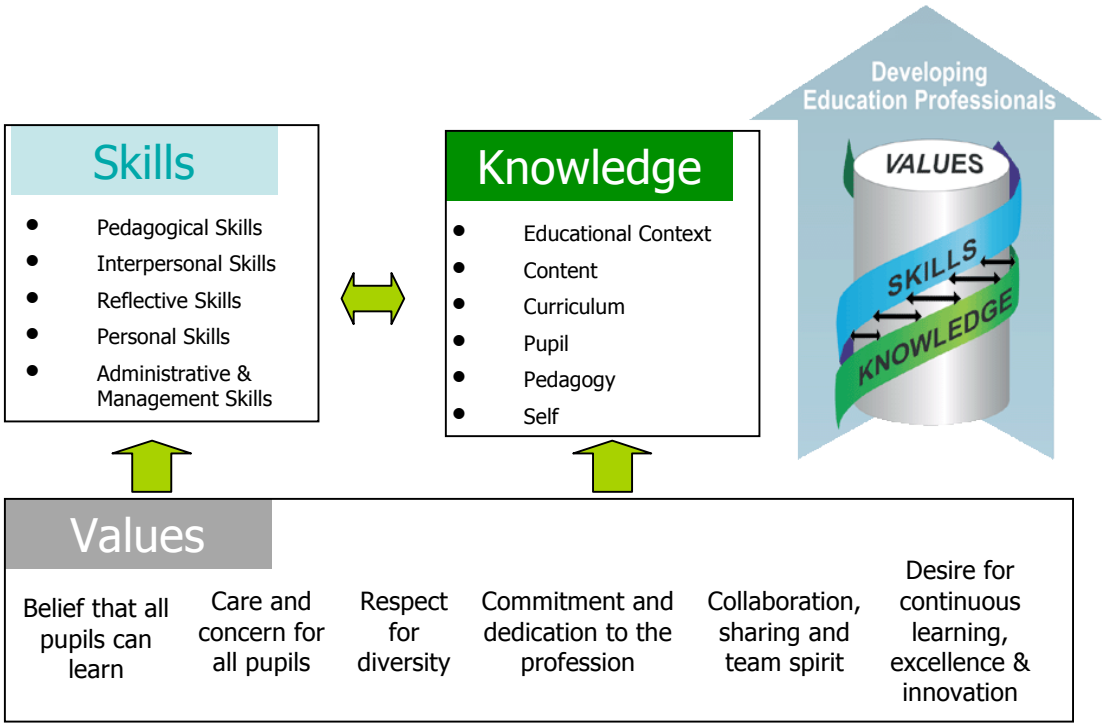

Figure 1: NIE's VSK Framework

Literature Review for the VSK framework

V. Values

Fraser and Saunders (1998) claimed that 'values should be high on the agenda for those concerned with teacher education', and that values should underpin teacher education. Literature shows that little attention has been given to considering how student and beginning teachers might reflect on their personal and professional values (Haydon 1997, Fraser & Saunders, 1998). 'Learning to teach is fundamentally a personal challenge where practical, personal and emotional attributes are just as salient as intellectual capabilities' (Cribb & Gewirtz, 2001, p. 47). Certain beliefs and attitudes are critical for teachers to be effective. They include respect for all learners and their experiences, confidence in their abilities to learn willingness to question and change one's own practices and a commitment to seek new solutions for problems encountered. The core values that underpin the curriculum at NIE are as follows:

V1. Belief that all pupils can learn

Teachers have the responsibility to ensure that all students develop to their fullest potential. Successful teachers believe that all their students are capable of learning – gathering information, understanding complex material, posing and solving problems, critiquing and questioning conflicting information, constructing alternative perspectives and synthesizing, comparing and analysing evidence (Irvine, 1997). Teacher education programmes should prepare teachers to develop contexts that will support the learning of all of their students (Darling-Hammond & Bransford, 2005).

V2. Care and concern for all pupils

Eisner (2002) suggests that teaching is a caring exercise. Teachers have the responsibility of involving pupils in purposeful academic learning, supporting and caring for them (LePage, Darling-Hammond Akar, Guiterezz, Jenkins-Gunn & Rosebrock, 2005). Korthagen (2001) believes that it's the teachers' task to guide children in this essential aspect of life, the development of self-understanding and a sense of interconnectedness. In particular, the care with which teachers support and guide all their pupils' learning forms an integral part for supporting pupils to succeed in learning (Noddings, 2005).

V3. Respect for diversity

Providing equal educational support to all students means that teachers and schools promote the full development of students as individuals without regard for race, ethnicity, gender, socio-economic status, abilities or disabilities. Teachers need to develop classrooms that are supportive of children and accept their differences. A learning environment that recognises children's strengths and differences is regarded as being positive because it allows children to share and experiences diverse perspectives (Banks, Cochran-Smith, Moll, Richet, Zeichner, LePage, Darling-Hammond, Duffy & McDonald, 2005). According to Villegas and Lucas (2002), culturally responsive teachers have multiple ways of perceiving reality. They hold positive views of students from diverse backgrounds and believe in bringing about change to make schools more equitable.

V4. Commitment and dedication to the profession

A central part of being a professional teacher is a commitment to help all students. Teachers should understand their roles and responsibilities as professionals in schools. They should be committed to prepare students for an equitable participation in a democratic society (Bransford, Darling-Hammond & LePage, 2005).

V5. Collaboration, sharing and team spirit

Collaboration is an essential element for effective change. School, home and community share the responsibility for children's success (Darrow, Fisch, Uhry & Ellsworth, 1998).

Teachers should find ways to work collaboratively and creatively with parents, engaging them in productive school activities. When teachers learn to work collaboratively they welcome rather than avoid feedback. Johnson (2003), in his study on collaboration cites Hargreaves (1994) in that collaboration promotes moral support, increases efficiency, improves effectiveness, reduces overload, establishes boundaries, promotes confidence, promotes teacher reflection, promotes teacher learning and leads to continual development.

V6. Desire for continuous learning, excellence and innovation

Teachers need to be lifelong learners (Darling- Hammond & Bransford, 2005). The content of the curriculum as well as methods and materials for teaching are changing so rapidly that teachers' must be continuous learners to maintain their professional effectiveness. Being innovative, efficient and be able to improvise during lessons help teachers become adaptive experts. An adaptive expert will desire continuous leaning and innovation. A truly adaptive expert in teaching appreciate the value of seeking feedback from many sources, is open to new ideas and continues learning throughout their lives (Hammerness, Darling-Hammond, Bransford, Berliner, Cochran-Smith, McDonald & Zeichner, 2005).

S. Skills

In the educational context, "skills" are referred to as achievements and/or behaviours to be acquired through practice or training to facilitate the student learning and classroom management (Irvine, 1997). Rather than separate, one-size-fits all kind of teaching skills, researchers note the interdependent nature of these teaching skills , required as a "set of procedures" (Grossman, 1990, p. 37) that teachers apply to provide a rich and varied pedagogical experience. According to Darling-Hammond, Wise, and Klein (1995), effective teacher education requires teachers to integrate multiple kinds of knowledge and skills as they are used in practice to forge connections between theory and practice.

S1. Pedagogical Skills

Understanding their subject as well as its central organising concepts; the ways in which new knowledge is created and how ideas are generated and communicated is important in developing rich, contextual understandings. Dewey (1902, in Irvine, 1997) recognized this importance when he posits that teachers must learn to "psychologies" their subject matter for teaching. In order words, teachers have "to rethink disciplinary topics and concepts to make them more accessible to students" (Grossman, 1990, p. 8).

Teachers should be able to develop and choose tasks that are developmentally appropriate and intellectually meaningful to ensure that all learners can understand. Fundamentally, they must possess a repertoire of representations that combine instructional techniques with subject matter and provide appropriate scaffolding to continually make learning interesting (Shulman, 1986). Skills which act like tools to support learning of such understandings include the creation and selection of teaching methods, presentation skills and use of technologies, learning activities, student groupings, classroom management, evaluation, and instruction materials.

S2. Interpersonal Skills

Teachers are members of learning communities. Teachers need to collaborate with parents, colleagues and others in the community in planning the instructional programme of the school and work together in planning and decision-making within teams, departments, or other educational units to assure continuity of learning experiences for students (NBPTS, 2002). As such, they need to possess proficient interpersonal skills to engage in meaningful communication and participate in collaborative efforts within the school as well as wider communities of learning for school-wide improvements. In managing the classrooms, teachers need to adopt a process of developing and maintaining conducive learning environments for effective learning to take place.

S3. Reflective Skills

Teachers need skills and practices for systematic, purposeful inquiry and critical reflection to analyse their ways of thinking about teaching and about learning to teach. According to Feiman-Nemser (2001) teachers must consolidate a professional identity about their values, beliefs and attitudes that shape and influence their teaching and learning process. The acquisition of reflective skills through collaborative inquiry where they will be able to critically examine their own conceptions with those of other people's, such as the experienced practitioners and those of educational researchers in what Hagger and McIntyre (2006) termed as "practical theorizing" (p. 58).

S4. Personal Skills

Teachers need coping and adaptability skills such as time management, goal setting, planning and setting priorities for the well-functioning of the classroom to facilitate different kinds of learning (Darling-Hammond & Bransford, 2005). Additionally, they need to be cognizant of current research and conduct their own research to test new approaches and hypotheses to cultivate their own learning. Proficient teachers reflect on their teaching and exemplify virtues they seek to impart to students, including life-long learning, tolerance and open-mindedness, as well as intellectual capacities as careful reasoning, logical reasoning and analytical thinking and problem solving (Darling-Hammond, 2006).

S5 Administrative and Management Skills

Teaching is a complex and demanding task and teachers are often expected to handle multiple roles both in the classroom and beyond. They must develop analytical skills that allow them to make sound decisions, investigate problems and understand students' needs (Darling-Hammond & Barnett 2001). Additionally, teachers also need to possess administrative and management skills in carrying out their roles outside the classroom, such as in facilitating team work between colleagues, collaborating with the wider learning community and in planning and managing co-curricular activities (Darling-Hammond & Bransford, 2005).

(K) Knowledge

When the student teacher graduates, the teaching will be situated in unique, physical, social and temporal environment, representing the intersection of multiple, interacting, and interdependent contexts. This environment will require the beginning teacher to call upon multiple ways of knowing to begin to enact the roles of her profession. Teachers need a knowledge base of standards, theories and ideals to inform their teaching practice.

Darling-Hammond & Baratz-Snowden (2005) emphasise that "teachers must know the subject they will teach and understand how to organize curriculum in light of both students' needs and the schools' learning objective." (p. 14). They conceptualized the knowledge base of teachers around a framework, highlighting three interconnected areas between teachers, learners and content: 1) knowledge of learners and their development in social contexts, 2) knowledge of subject matter and curriculum goals, and 3) knowledge of teaching.

This notion of this curricular content knowledge between teachers' knowledge of subject matter, the curriculum and in connection with the understanding of the students parallel's Shulman's (1986) theory of pedagogical content knowledge. The centrality of this knowledge lies in the notion that the teacher should have the capacity to bridge content knowledge to his or her practice of teaching and the nature of this bridge requires a clear knowledge and understanding of the conceptions of three key areas of learners, curriculum and social contexts.

K1. Knowledge of Educational Contexts

Learning and development are deeply embedded in cultural contexts. Hence, understanding how children learn and develop in a variety of ways, taking into account the socio-cultural and socio-political contexts they live in is critical for effective teaching. In the Singapore context, it is important that teachers develop a curricular vision to teach in an understanding of learning and learners as these intersect with the educational goals of the Singapore school system and the broader context of national and international issues. As Darling-Hammond et al. (2001) further states, teachers need to understand their role as a teacher in the wider context beyond the classrooms and are cognizant of professional norms and expectations of their educational contexts.

K2. Knowledge of Content

Teachers must first know and understand their subjects they teach in order to help students develop a rich understanding and appreciation of the content. As Shulman (1986) notes that "in the face of student diversity, the teacher must have a flexible and multifaceted comprehension [of subject matter], adequate to impart alternative explanations of the same concepts or principles" (p.9). Bestor (2008) posit that a strong foundation in subject matter would allow teachers to use this knowledge flexibly to command teaching strategies that address a variety of ways to learn in today's complex society and economy.

K3. Knowledge of Curriculum

A knowledge base of the types of curriculum materials and resources available for different levels and abilities and other major resources is particularly useful for beginning teachers. Teachers not only need to know how to find these resources, but also to critically assess and examine their strengths and weaknesses of the content and skills included in the curriculum materials in light of the required standards, curriculum frameworks and assessments (Darling-Hammond & Baratz-Snowden, 2005). This entails knowledge of the syllabi; the central topics, development sequences and assessment modes of the discipline(s) they specialize in to make curriculum and assessment decisions to impact their students' achievements.

K4. Knowledge of Pupils

To understand and support students' learning, teachers must be able to take a "developmental perspective" (Darling-Hammond & Baratz-Snowden, 2005). This means that teachers have to understand the linkages between development, knowledge and learning to support all aspects of a student's learning and development. They will be able to observe patterns as students progress in their understanding and further engage them towards systematic reasoning. Apart from the cognitive development, teachers will need to understand the psychological and emotional pathways of each child, and target methods to foster students' self-esteem, character, and motivation.

K5. Knowledge of Pedagogy

To connect students and subject matter in meaningful ways, teachers must develop a pedagogical stance in knowledge of child/adolescent development and learning. Darling-Hammond & Barnett (2001) discusses the need for teachers to develop a curricular perspective; to learn how to evaluate, select and organize important theoretical concepts and approaches and present in ways for different types of learners and abilities. In addition to this, teachers need to possess knowledge of other pedagogical tools such as classroom management, assessment strategies and curriculum and instruction techniques to facilitate and motivate student learning.

K6. Knowledge of Self

Teachers play a major role in knowledge, skills and experiences construction. They must continually engage in a critical examination of their beliefs and values about teaching to form visions about what are possible and desirable conceptions of teaching (Feiman-Nemser, 2001). To make sense of learning, teachers need to develop a conceptual framework of their teaching and be able to identify and question their assumptions about learning. This meta-cognitive process is described by Darling-Hammond and Barnett (2001) as a reflective inquiry to make explicit teachers' own assumptions about teaching, a key part of which involves critically examining them to identify areas for development. A clear understanding of one's strengths and weaknesses, therefore, is important as it makes sense of problems and issues that arise in the classroom and help resolve curricular problems (Irvine, 1997).

A student teacher is called competent if he is able to make choices from his repertoire of behavior and actions, based on the acquired knowledge, skills and values (Cribb & Gewirtz, 2001). This set of teacher's values is central to the mission of being learner-centred and learning-centred in the 21st century classroom. From this, the development of knowledgeable and skilful teachers who are able to respond differently and appropriately to pupils' interests and needs can enable diverse learners to succeed at much more challenging learning goals. These goals should include helping pupils to think critically, create, and solve complex problems, rather than merely to perform rote tasks.

Part Two

Aims of Analysis of Data

The data for this paper is part of a programme evaluation study. The main objective of this data analysis was to evaluate the validity and reliability of the items in each of the scales developed to measure the values, skills and knowledge the student teachers perceive to have acquired. The items were based on the VSK framework. The analysis seeks to answer the following:

1. Do all the items in each of the scale measure the same construct that they were meant to measure namely, Values, Skills and Knowledge pertaining to teaching and learning?
2. Are the derived scales from the above analyses of the items as a whole reliable?

Methodology

Demographic background of the sample

The sample for this study comprised 676 student teachers who were enrolled in the primary and secondary tracks of the 2007 intake of the one-year Post Graduate Diploma in Education (PGDE) initial teacher preparation programme of National Institute of Education, Singapore. Two hundred and forty four students (36.1%) were enrolled in the Primary programme and the rest four hundred thirty two (63.9%) were enrolled in the secondary programme. In the sample 217 (32.1%) were male and 459 (67.9%) were female. The age range of the participants in both tracks showed 32.4% (219) student teachers were below 25 years, 51.8% (350) were 25-30 years, 9.0% (61) were 31-35 and 6.8% (46) were above 35 years. About 52% of the student teachers had some teaching experience through contract teaching before joining the PGDE initial teacher preparation programme.

Instrumentation

The enhanced PGDE programme based on the VSK framework with three major thrusts namely Values, Skills and Knowledge, aims to develop teachers who are competent, confident and life-long learners. For each of these three constructs there are ten dimensions. For the construct of **Values** the ten underlying dimensions that were selected are

- *belief that all pupils can learn*
- *the need to reflect on one's practice*
- *cultivate a spirit of innovation and enterprise*
- *commitment to teaching profession*

- *the need to work with parents*
- *appreciate individual difference*
- *teaching one's subject well*
- *commitment to Singapore Education System*
- *upgrade one's knowledge and skills continuously*
- *value service to others and the community.*

For the construct of **Skills** the following dimensions were selected –

- *deliver effective lessons*
- *motivate students*
- *facilitate thinking*
- *manage classroom discipline*
- *assess pupils' learning*
- *work with parents and other stakeholders*
- *apply theory to improve teaching*
- *articulate beliefs about teaching and learning*
- *manage work and time*
- *manage co-curricular activities.*

For the construct of **Knowledge** –

- *content knowledge of subject*
- *select content material*
- *deal with pupils' questions*
- *types of teaching strategies*
- *use of technologies*
- *modes of assessment*
- *seek and use feedback*
- *guide pupils in projects*
- *adapt lessons to pupils' needs*
- *develop and use assessments appropriately*

Based on these dimensions a survey questionnaire was developed. Student teachers' perceptions of their level of "Values", "Skills" and "Knowledge" were assessed using the thirty-item questionnaire. They responded to each item on a 6-point Likert rating scale; from very strongly disagree to very strongly agree.

Data Collection

The survey questionnaire was completed by the student teachers just before they graduated. The questionnaire was administered electronically on-line. The participants were told that the questionnaire was anonymous and they were requested to give their feedback to help NIE in its continual effort to assure the quality of her pre-service education programmes

Data Analysis

The data were analysed using the SPSS: PC Window Program and were subjected to confirmatory factor analysis. The Principal Component Analysis method was used first, a correlation matrix was computed for the 10 items under each construct (values, skills and knowledge) to examine whether the cluster of variables correlates to each other. The

communality that measures the percent of variance in a given variable explained by the factors extracted is also examined. Reliability analysis was used to check the reliabilities of the three scales: Values, Skills and Knowledge for performing comparative analyses with independent variables.

Results and discussion
Values Variables

The matrix of correlation coefficients and their respective significance level for the 10 items designed to measure student teachers' Values concerning teaching and learning is shown in Table 1 below. The values of the correlation coefficients range from moderate .35 to high .72 and all the correlation coefficients are significant at the .001 level. This indicates all the ten dimensions selected to formulate the survey items have one underlying construct - Values with regards to teaching and learning.

Variable (item)	1	2	3	4	5	6	7	8	9	10
1. pupils can learn	1.000									
2. reflective	.689	1.000								
3. innovative enterprise	.596	.698	1.000							
4. commitment	.364	.434	.506	1.000						
5. work well parents	.551	.596	.618	.494	1.000					
6. know ind diff	.650	.632	.630	.454	.721	1.000				
7. teach well	.592	.624	.587	.416	.595	.705	1.000			
8. mission Ed Service	.535	.599	.641	.600	.650	.646	.640	1.000		
9. upgrade knowledge	.610	.699	.643	.468	.610	.667	.666	.675	1.000	
10. service learning	.359	.407	.510	.640	.509	.468	.393	.558	486	1.000

Table 1: Matrix of Correlation coefficients of Value [Correlation coefficients are significant ≤.001 level]

The communalities shown in Table 2 below indicate the percentage of variance in a given variable explained by the extracted factors. The values are moderate to high indicating the variables analyzed have much in common. The principal components analysis with Eigenvalues set at over 1 extracted only one unrotated factor solution. All the variables have high loading on this factor, which seems to reflect that just one factor underlies these variables, namely Values. These results are shown in Table 3.

	Initial	Extraction
pupils can learn	1.000	.578
Reflective	1.000	.669
innovative enterprise	1.000	.674
commitment	1.000	.447
work well parents	1.000	.657
know ind diff	1.000	.710
teach well	1.000	.636
mission Ed Service	1.000	.695
upgrade knowledge	1.000	.699
service learning	1.000	.438

Table 2: Communalities – Values variables
Note: Extraction Method: Principal Component analysis.

	Component
	1
know ind diff	.843
upgrade knowledge	.836
mission Ed Service	.834
innovative enterprise	.821
reflective	.818
work well parents	.810
teach well	.797
pupils can learn	.761
commitment	.668
service learning	.662

Table 3: Component Matrix

Skills variables

The matrix of correlation coefficients and their respective significance level for the 10 items designed to measure student teachers' Skills related to teaching and learning are in Table 4. The values of the correlation coefficient range from moderate .51 to high .78 and all the correlation coefficients are significant at the .001 level. This indicates all the ten dimensions selected to formulate the survey items have one underlying construct, in this case skills related to teaching and learning.

Skill variable	1	2	3	4	5	6	7	8	9	10
1. deliver effectively	1.000									
2. motivate	.782	1.000								
3. facilitate thinking	.762	.759	1.000							
4. manage discipline	.659	.662	.685	1.000						
5. know assessment	.630	.608	.668	.660	1.000					
6. work stakeholders	.512	.549	.583	.598	.601	1.000				
7. improve teach	.553	.594	.572	.575	.618	.615	1.000			
8. personal beliefs	.650	.636	.638	.605	.579	.540	.600	1.000		
9. manage time work	.638	.624	.649	.569	.586	.553	.550	.661	1.000	
10. manage cca	.587	.569	.595	.606	.572	.596	.570	.579	.677	1.000

Table 4: Matrix of correlation coefficients of skills [Correlation coefficients are significant at ≤ .001 level]

The communalities shown in Table 5 below indicate the percentage of variance in a given variable explained by the extracted factors. The values are moderate to high indicating the skill variables analyzed have much in common. The principal components analysis with Eigenvalues set at over 1 extracted only one unrotated factor solution. All the variables have high loading on this factor. This indicates that just one factor underlies these variables, namely Teaching Skills. These results are shown in Table 6.

	Initial	Extraction
deliver effectively	1.000	.709
motivate	1.000	.710
facilitate thinking	1.000	.738
manage discipline	1.000	.672
know assessment	1.000	.650
work stakeholders	1.000	.570
improve teach	1.000	.591
personal beliefs	1.000	.644
manage time work	1.000	.647
manage cca	1.000	.613

Table 5 Communalities – Skills variables
Note: Extraction Method: Principal Component analysis.

	Component
	1
facilitate thinking	0.859
motivate	0.843
deliver effectively	0.842
manage discipline	0.820
know assessment	0.806
manage time work	0.804
personal beliefs	0.802
manage cca	0.783
improve teach	0.769
work stakeholders	0.755

Table 6 : Component Matrix

Knowledge Variables

The matrix of correlation coefficients and their significance level for the 10 items designed to measure student teachers' Knowledge related to teaching and learning are shown in Table 7. The values of the correlation coefficient range from moderate .56 to high .80 and all the correlation coefficients are significant at the .001 level. This indicates all the ten dimensions selected to formulate the survey items have one underlying construct. In this case knowledge related to teaching and learning.

Knowledge Variables	1	2	3	4	5	6	7	8	9	10
1. content knowledge	1.000									
2. content materials	.762	1.000								
3. answer pupil question	.747	.775	1.000							
4. teaching strategies	.627	.693	.669	1.000						
5. app technologies	.619	.687	.668	.751	1.00					
6. assessment modes	.611	.651	.624	.737	.721	1.00				
7. feedback improve	.561	.642	.636	.659	.677	.708	1.00			
8. guide project	.589	.635	.631	.698	.659	.751	.696	1.00		
9. cater diversity pupil	.577	.653	.612	.692	.641	.709	.626	.783	1.00	
10. use assessment	.624	.696	.667	.713	.656	.707	.677	.732	.801	1.00

Table 7: Matrix of correlation coefficients of skills [Correlation coefficients are significant at .≤001 level]

The communalities shown in Table 8 indicate the percentage of variance in a given variable explained by the extracted factors. The values range from .63 to .74. The values are moderately high indicating that the knowledge variables analyzed have much in common. The principal components analysis with Eigenvalues set at over 1 extracted only one unrotated factor solution. All the variables have high loading. This indicates that just one factor underlies these variables namely Teaching Knowledge. These results are shown in Table 9.

	Initial	Extraction
content knowledge	1.000	.632
content materials	1.000	.729
answer pupil question	1.000	.695
teaching strategies	1.000	.741
app technologies	1.000	.707
assessment modes	1.000	.737
feedback improve	1.000	.667
guide project	1.000	.727
cater diversity pupil	1.000	.712
use assessment	1.000	.748

Table 8: Communalities – Knowledge variables
Extraction Method: Principal Component Analysis.

	Component
	1
use assessment	0.865
teaching strategies	0.861
assessment modes	0.858
content materials	0.854
Guide project	0.853
cater diversity pupil	0.844
app technologies	0.841
answer pupil question	0.833
feedback improve	0.816
content knowledge	0.795

Table 9: Component Matrix

Reliability of the extracted scales

The ten variables (items) for each of the three measures namely, Values, Skills and Knowledge were subjected to reliability analyses. The Cronbach alpha reliability coefficient of the three scales, Values, Skills and Knowledge were found to be high, .931, .941 and .954 respectively (see Table 10). Hence the scales can be used with confidence to measure the student teachers' perception of their levels of Values, Skills and Knowledge related to the teaching profession.

Scale	Number of item	Cronbach's alpha
Values	10	.931
Skills	10	.941
Knowledge	10	.954

Table 10: Reliability coefficients of scales

In summary the second part of this paper discussed the validity of the variables to be used to measure the perception of student teachers of their level of their values, skills and knowledge. The variables selected to measure each of the constructs were moderate to highly correlated with each other. The reliability coefficients of the factor scales were also high. From these findings we can conclude that the derived scales may be used for the student teachers' perception of their levels of values, skills and knowledge derived from the teacher education programme.

Conclusion

The study reported here has moved from a process of identifying the attributes required to carry out the roles of a beginning teacher to one of articulating some of the maxims which point towards the underlying philosophy of teaching. The VSK framework not only constructs the parameters of teachers' working knowledge and skills, it also outlines the challenge of developing a set of values in the student teachers in acquiring their proficiency and competence in teaching. The listed attributes are, as shown by the supporting literature, inherently generic structures and the expectations of teacher performance they establish are for all classrooms in all educational contexts. But the reality of teaching can be very different. The journey that each beginning teacher takes, though with familiar signposts, is unique because it is constructed differently for specific teaching situation. Literature shows that an adaptive teacher is metacognitive, they continually self-assess their performances and modify their assumptions and actions as needed (Hammerness et al., 2005). The task of successfully preparing teachers in the Singapore to effectively work with an ever-increasing diverse student body represents a pressing challenge for teacher educators.It is impossible for teacher education programs to prepare teachers for all situations. Therefore, it is important that beginning teachers are willing to learn from their experiences in changing circumstances.

A contextual link must be established between the specificity of the beginning teacher's context and the generality of the structured values, skills and knowledge as defined in the VSK framework, or any other attributes framework. While the VSK framework provides, for the graduating student teacher, maxims of teaching and learning, it is isolated from her potential

practice. However, the need to identify and understand principles for beginning teachers is now more important than ever, given the rate of change and the frenzied expansion of education – such frameworks are important reference points for use in both traditional and evolving contexts. Context divides the preparation from the practice, the 'student teacher' from the 'beginning teacher'. The VSK is to be applied within a humanizing pedagogical framework-- culturally responsive education and strategic teaching – Bartolomé (1994, 2008) emphasizes the need for teachers' evolving awareness of their relationship with students as knowers and active participants in their own learning.

Beginning teachers should see their initial teacher education as the start part of a continuum of professional learning. They have to develop a problem-solving attitude and the skills necessary to learn from experience through reflection. A challenge for teacher education then becomes one of acknowledging the totality of experience and of valuing the knowledges of contextualised experiences as a supplement to the theory of the framework to inform the practice of teaching and learning.

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