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ABSTRACTING/INDEXING

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Professional Development Needs: Early Childhood Teachers in Public Child Care Centers

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Abstract: This paper critically examines the various needs of early childhood teachers and nano, micro, meso and macro factors that influence the teachers' behavior and their classroom teaching in public child care centres in rural India. Implications have been drawn for effective Early Childhood Care and Education in general and for India in particular.

Keywords: Early childhood care; Teacher professional development

Early Childhood Care in Indian Society

Early childhood is a crucial period of physical, cognitive, social and emotional growth for children. This early childhood development and transitions are greatly influenced by local, socio-cultural context and relationship of the young. Traditionally, the early child rearing in India is seen as a prerogative of the family, especially the women as gender roles were clearly demarcated. According to Kaul and Sankar (2009), the early years (from prenatal to five years) were considered to lay the foundation for inculcation of basic values ('sanskaras') and social skills in children through interaction with the family and community members and the scriptures advocate an attitude of *lalayat* or indulgence, as the desirable mode of child rearing at this stage, as compared to more disciplinary approach for the older child. Much of the early care and education of the child was informal, within the family and through traditional wisdom of the grandparents carried from one generation to the other. However, this traditional view of care and education of the young has undergone changes in India, especially post liberalization era in 1990s.

Changes in family welfare policies as well as public support systems like the provisions of high quality public crèches have not been as rapid as the demand for them allowing the private sector to take on this role. While children from the higher socio-economic strata are often left with paid care givers or private crèches, in the lower socio-economic communities the responsibility of childcare gets loaded on to the older siblings, often girls, thus keeping them often out of school and robbing them of both their childhood and basic education (Kaun & Sankar, 2009). For the majority, however, publically-financed schemes must suffice. The quality of these programs varies greatly; and even in the best-case scenarios, there is far more attention for health and nutrition than there is for early childhood education. To improve the quality of learning experiences for young children in these centers, attention must be given to the knowledge and skills of the caregivers working there. The purpose of this study is to understand the critical factors that affect public child care teachers' implementation of developmentally appropriate practices, so that recommendations for improvements can be made.

Theoretical Underpinnings

Effective childhood education programs especially for the under resourced communities have professionally prepared teachers and staff with regular staff

development and structures that supports teachers in their teaching like presence of developmentally appropriate curricula and materials, rigorous monitoring, evaluation and active parental involvement (Reynolds, 1998; Jalongo et al, 2004). Moreover, sound program objective with focus on instruction, supporting policies and leadership make a sound context for education innovation to be implemented (Raval, 2010). Early childhood programs are themselves systems. As such, they are organized whole of norms, values, structures and people which form various subsystems at different levels. Various factors interplay at different levels and influence the way the system works and ultimately what teachers do (or not do) in their classrooms. These factors, described in the remainder of this section, operate at different levels – nano (child and teacher), micro (resources in the instructional, community and home settings), meso (institutional factors) and macro (to form proximal and distant, direct as well as indirect effect on the quality of the educational process).

Nano level

Individual characteristics of the child like health and nutrition, disabilities affect her own learning in the preschool years. This is especially important in areas affected by severe malnutrition, where the effect of malnutrition can be seen on the physical, cognitive and social development of the child. Similarly, regularity of children to preschool and retention throughout the period of formal instruction also affect the learning outcomes of children (Tait et al, 2002). Experiences of children in the preschool help develop personal skills like self regulation and social competence such as sharing, playing together and interaction with peers. This is usually seen as variety in activities, how experiences for children is organized, choices available to children, patterns of activity, eating, resting, play, etc. (Woodhead, 1996). To achieve effects, stability of routine is necessary (Peralta, 2008).

Child outcomes and teacher's self efficacy are interrelated. Teachers with high sense of self efficacy lead to better student engagement and outcomes (Tschannen-Morana & Woolfolk Hoy, 2001). Other personal characteristics, such as professional competencies ore motivation can positively influence teaching practices in the classroom (Darling Hammond, 2006). Personal characteristics of preschool teachers include their levels of self efficacy about instruction (Hover- Dempsy, 2005; Kim, 2009), their beliefs about children and child centered instruction (Stipek; Daniels; Galluzzo & Milburn, 1992). Teachers' professional competencies like knowledge about child development, developmentally appropriate curriculum and pedagogical approaches to instruction as well as their ability to apply this to group of learners with diverse needs in their everyday practice influence how they perform in their classrooms. Similarly teachers are adult learners and their learning needs influences their motivation to learn. Teachers' perception about the relevance and usefulness of training program influences how well they integrate their knowledge into practice (Stein & Wang, 1988). For example, Raval (2010) suggests that teachers are more open to learning when they believe that the new tasks expected of them are practical and relevant.

Micro level

Factors that relate to the preschool center deal with structural aspects like resources available at the center level, staff- child ratio, physical setting as well as procedural aspects like class preparedness and classroom processes like teacher child interaction

(Rao, 2010). Facilities or the physical infrastructure at the early childhood center forms the basis for delivering the early childhood care and education. It entails free indoor and outdoor spaces for children to move, play and work adequate teaching learning materials, hygienic sanitation and food serving practices (Woodhead, 1996; Rao, 2010). Inadequacies in these may affect the procedural quality and may impact the learner outcomes therefore. Studies of programs which are large scale, federally funded for the disadvantaged often show lack of these resources. For example, about one-third of government The centers in India have pucca buildings, about another third have semi-pucca construction, less than one-third are in kutchha buildings, and a handful function from open spaces, such as under trees. Cooking space is typically inadequate, as reported by 55% of teachers across the country. Around 85% of rural and 90% of tribal centers in Maharashtra have no toilet facilities, especially in rural and tribal areas. The majorities of centers obtain their drinking water from a tap or hand pump, but the water source varies substantially across state and rural-urban-tribal location (Gragnolati; Shekar & Dasgupta, 2005).

Parental and community involvement at home as well as at the centre, play significant roles in ensuring continuity and consistency in child experiences and synergy between home, preschool and school. They are sometimes categorized as inputs in the program as well as the process of the program (Myers, 2004; Woodhead, 1996; Peralta, 2008; Barlett, 2001). Local culture and beliefs about children and education, community dynamics, powerrelationships, expectations of a community from education (including preschool education) all have a great influence on the functioning of local ECE centers, the content taught as well as ways of teaching- learning. Active community participation in preschool education affect the way parents get involved and can provide a social audit for the way center based preschool interventions work (Ramchandran, 2005) and raise social capital (social networks, relationships based on mutual trust) essential for the care of the young in the community (Farrell Tayler & Tennent, 2004). When ECE is seen as a part of larger community and family welfare initiative, it works to strengthen the participation of all the stakeholders involved in care and education of the young. The extent of community participation depends on a variety of factors including the resources available to community at hand. Most often in rural under resourced areas, community contribution is restricted towards infrastructure help like providing a place as well as raw materials for construction and not in the actual teaching learning experiences (Kholowa & Rose, 2006). The limited nature of community participation is often linked to the dilemma in which community members find themselves in terms of whether to set priorities on working towards addressing their household poverty concerns, or supporting pre-schooling (Kholowa & Rose, 2006).

Parental involvement in early childhood intervention programs is associated with greater benefits from the intervention which otherwise would be limited. Parental involvement is often rationalized on grounds of being cost effective (same outcomes can be achieved at less cost) being a way of sustaining the impact of the intervention or the program and for social audit, advocacy and helping maintain the quality of the program (White, Taylor & Moss, 1992). Grolnick and Slowiaczek (1994) have defined parent involvement as “the dedication of resources by the parent to the child in a specific domain.” However parents get involved in a variety of ways. Epstein (1995) has developed an ecological framework of parent involvement consisting of five types of involvement, ranging from more proximal to more distal types (1) Basic Parental Obligation - establish home environments which

foster and support children's learning and development; (2) Basic obligation of the school - Communicating with parents about program expectation and evaluations (3) Parents involvement at school –e.g.: volunteering for class or field trips; (4) Parent involvement at home in learning and development activities (5) Parental involvement in governance and Advocacy – Helping schools in decision making (as cited in Huntsinger and Jose, 2009; McBride and Lin, 1996).

Meso level

Factors at the meso level provide an immediate environment and context for the teacher at the nano level and the ECE center at the micro level to function. This includes the institutional factors like policy regarding ECE, structures and systems for curriculum, materials, assessment, teacher development and ongoing support, time availability and perceived role of the teachers.

There is scarce literature available on empirical studies of early childhood teacher preparation to inform practice (Lobman, Ryan & McLaughlin, 2005). But according to Lobman, Ryan & McLaughlin (2005) early childhood teachers need to be prepared in four general areas. Knowledge about child development and pedagogy, content knowledge like language development, early mathematics, science and arts, application of this knowledge in specific planning, assessment and adaptation of instruction to meet needs of diverse learners and to experience and practice what they have learnt through direct work with children.

According to Raval (2010), Mankin (2009) the literature on professional development shows that professional development is attributed by

- Situated/authentic instructional focus - Learning is connected to and derived from the teacher's practice through authentic tasks and 'assignments' in their day to day work.
- Collaborative learning settings – Learning is grounded in interaction and sharing knowledge/experiences with peers.
- Self direction - Engaging teachers actively in planning and reflection to develop their own classroom practice; involving teachers actively in their own learning process
- Sustainability - Learning teachers are coached and provided continuous ongoing support during their professional development process.

Moreover, a tight coherence and integration between theory (training) and practice (classroom enactment), extensive and intensely supervised practice with opportunities to integrate it with theory and closer, proactive relationships between training and schools that serve diverse learners effectively and model good teaching (Darling Hammond, 2006). She further states that the quality of any teacher preparation program tends to be characterized by two interrelated factors – 1) the content of the curriculum and 2) the available resources or capacity of an institution to provide that content through its faculty and structural characteristics (as cited in Lobman, Ryan & McLaughlin, 2005). Such professional development should be relevant and useful to the teachers in tackling day to day instruction problems in the classrooms and therefore should take into account personal (e.g. Teacher beliefs and perceptions), professional competence (knowledge and skills) and teacher needs (Darling Hammond, 2006). When teacher practices, beliefs and self-efficacy needs to be altered, teachers need positive experiences of learning themselves including self

learning, learning from sharing with peers and active relevance to their work. They need to be extensively supported and coached through constant perspective building, practice, reflection and feedback to make learning effective and relevant.

Finally, Raval (2010) identifies that a critical factor in supporting teachers to implement DAP in their classrooms is a leader who can foster a shared vision amongst members, elicit their active participation in decisions and share authority with members. The role of the leader in linking the training to real practice is critical as he/she acts as a coach and a guide to help problem solve, adapt and change practices in classrooms thereby building skills of the early childhood education teacher. Though the literature on the role of the supervisor in service preschool development is thin, some inferences can be made from the literature on supervisor's role for pre service preschool teachers. Supervisors primarily help with the transfer of learning from the training and workshops to the classroom situations through 1) Presentation of theory or description of skill or strategy; 2) Modeling or demonstration of skills ; 3) Practice in simulated and classroom settings; 4) Structured and open-ended feedback (provision of information about performance) ; 5) Coaching (Boydell, 1986). Moreover, in under resourced contexts, supervisors essential help problem solving through brain storming of possible solutions, plunging in whenever required, providing administrative support, personal mentoring and helping teachers fulfill their job responsibilities effectively.

Macro level

Factors at macro level provide an overall context for the ECE system to work. These include policies regarding ECE, governance, quality and regulation mechanisms and budgetary allocations. Governance, quality regulations and budgetary allocations are three critical issues in ECE policy (UNESCO, 2007; Kaul & Sankar, 2009).

Governance of the ECCE program includes matters of administrative coordination and decision making both within the layers as well as between the layers (UNESCO, 2003). Governance also includes issues of decentralization in program planning and implementation. This leads to issues of strong policy framework and program standards and regulations as well as capacity building of state, district and local functionaries in developing bottom planning and implementation (UNESCO, 2003; Kaul & Sankar, 2009).

Quality of the ECE program depends on policies and frameworks regarding staff, training, monitoring and evaluation, curriculum, accreditation (UNESCO, 2007). Outcomes approach which focuses on the milestones or outcomes in children's learning and development rather than on the features of the early childhood program (Myers, 2005) is one of the way of establishing quality framework. Quality of the program can also be improved with improving the regulations and conditions of the ECE workforce (Kaul & Sankar, 2009; UNESCO, 2007).

ECE programs generally command a small portion of government budgets (Myers, 2000), especially in developing countries where resources are scarce as is the case with, which commands only 20% for child related outlays as compared to 70% by primary education (Kaul & Sankar, 2009). One of the big challenges in expenditure on ECE is mobilizing funds, especially with large-scale programs with universal access. Studies (Myers, 2000; UNESCO, 2007) suggest a number of ways to address this, 1) Strengthen the capacity of states and municipalities to obtain resources

for ECE, 2) Seek cost-effective approaches including quality community-based non-formal approaches to ECE, 3) Explore alternative avenues of funding such as philanthropic contributions, and private-sector involvement and 4) Appropriate targeting - When funds are less, direct them to the neediest.

Conceptual Framework

Based on the descriptions above, the conceptual framework is shown in Figure 1. This presents the factors at the nano, meso, micro and macro levels, influencing teacher practices in ECE classrooms. At nano level, teacher's personal characteristics (perceptions & beliefs), professional competencies (knowledge and skills) and learning needs and motivation are important determinants of what teachers learn and do in their classrooms; it also includes child factors like regularity, retention in the learning process affect their school readiness levels. At the micro level, facilities at the ECE, teacher preparedness in terms of curriculum, material, lesson plan and classroom processes like teacher child interaction, teacher response and class management affect what children learn. Along with it, parental and community support and perceptions to the ECE centers as well as teachers influence what goes on in the classrooms. The macro level factors like policy, governance and quality regulations and funding influence the way the program is organized, the priorities where the human and concrete resources are to be focused and the strategy of implementation. These have direct impact on the way the program functions at the meso and micro levels.

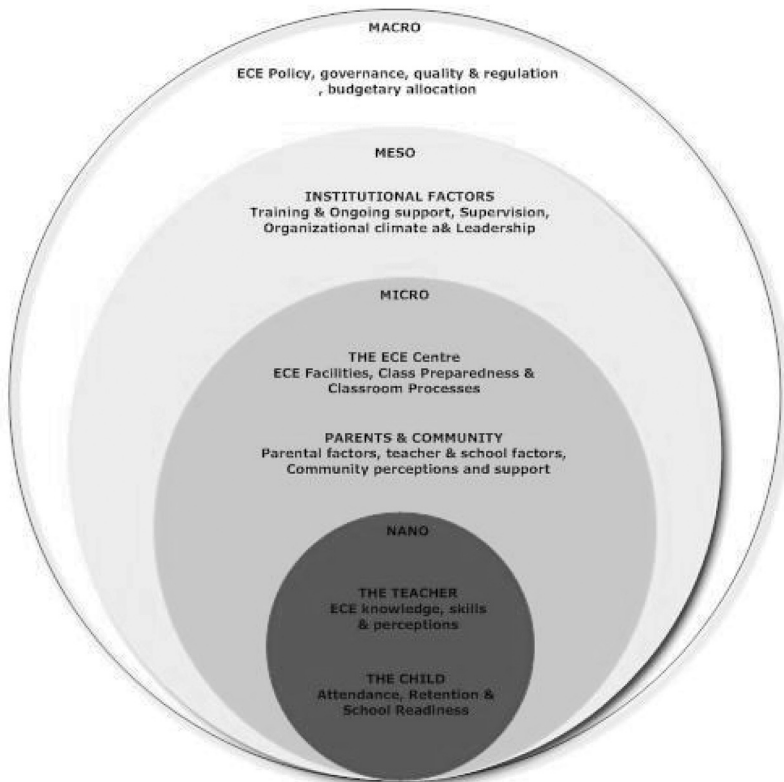


Figure 1: Conceptual framework underpinning this study

Methods

Research questions

The main aim of the study was to understand the current status of early childhood education in ECE centers and the contextual (community, institutional and organizational) factors which influence teachers to conduct developmentally appropriate practices in their classrooms. As detailed investigation into the macro level was beyond the scope of this investigation, the data collection focused on the other three levels but did explore implications of macro level decisions on these levels. The main research question and sub questions that guided this study were:

What is the current status of teacher and children factors (at nano level), classroom and parental factors (at micro level) and institutional and organizational factors (at meso level) which influence (enhance or inhibit) ECE teacher abilities to implement child centered ECE curricula? The following sub-questions were also formulated:

1. (At the nano level) What is the current status of attendance, retention as well as school readiness outcomes of children?
2. (At the nano level) What is the status of current knowledge, skills and perceptions of ECE teachers towards ECE as well as their role in center?
3. (At the micro level) What is the current status of ECE facilities, classroom preparedness as well as teaching learning processes in the ECE centers?
4. (At the micro level) What are the current perceptions as well as support from parents and community towards ECE as well as center and ECE teacher?
5. (At the meso level) What is the current status of institutional and organizational factors, which influence (enhance or inhibit) ECE teacher ability to implement child-centered curricula?

Sampling

The current study is a needs and context analysis study. The research design used here is a cross sectional design. A cross sectional study examines more than one group of people (entire population or a subset) at one point in time to help answer the research question (Salkind, 2010). This design is useful for this study as its resource efficient design allows for data to be collected from different stakeholders to understand the current status as well as enhancing and inhibiting factors which influence teachers to implement ECE practices. Through stratified random sampling of publically accessible child care centers in rural India, 18 centers in 9 sub-regions. In each sub-region, one of the ECEs selected had previously experienced external support, and one had not. The centers in which previous intervention had taken place are hereafter referred to as ECE-Is; the regular centers are hereafter referred to as ECE-Rs.

Participants

At the nano level, two main participants were involved in study: children and ECE teachers. Five children in the age group of 5-6 years (an age where school readiness can be measured) from each of the 9 ECE-Is were administered school readiness test to understand their current levels on aspects of school readiness like cognitive, language and behavioral development. Five children were selected, as

these were the highest number of regular children in the age group of 5-6 coming to the centers. Similar data from the ECE-Rs centers had been collected a year before, and the assumption was that the scores could be used as the results would remain similar.

Each of the 18 ECE teachers from the sample of 18 ECE centers participated in this study. Most of these teachers belong to the same community where they served. The ages of the ECE teachers ranged from 29-48 years, with the mean age being 41 years. The highest educational qualification achieved ranged from grade 7 to grade 12, with the mean level of education being grade 10. All ECE teachers had substantial years in service, ranging from 6 to 30 years, with a mean of 17.5 years serving as ECE teacher.

At the micro level, convenience sampling was used to select parents and community members for participation in this study. Five to eight parents (either mother or father or both- depending on their availability) of children who are regular ECE centers were interviewed to understand their perceptions. These parents were selected based on the regularity of their child to the center as well as their availability at the time of the visit. The visit was usually conducted after six in the evening when parents would return from their farms or work. In five villages, community meetings or an informal focus group was conducted and the meeting notes were collected. In other villages where such meetings were not possible, five to eight individual parents were interviewed. Thus, convenience sampling was used to select parents for data collection.

Each village or sometimes a group of villages in rural India have an elected representative body of five people called 'Gram Panchayat'. Gram Panchayats are the basic units of administration in the Panchayati Raj, a system of governance in India. It has 3 levels: village, block and district. These Gram Panchayat members are elected by the village members and are usually the respected people in the village. One or two of these influential members of the community in each village were interviewed to know their perceptions regarding ECE, the center and the teacher working there. These interviews were semi structured and often informal and were conducted according to the availability of these people on the days of the visit.

At the meso level, supervisors and ECE program staff participated. Two sub-regional meeting observations were conducted to understand the actual status of the on-going support provided by the supervisors to the ECE teachers. These meetings were chosen based on their occurrence during the data collection time period. The supervisors who conducted these circle meetings were then chosen for an interview to understand their perceptions regarding their role, the role of the center, the childcare teacher, and the nature of support to the teachers for conducting ECE activities in their classrooms. ECE program staff interviewed included the regional field officer (regarding his perception of ECE training and ongoing support, community support, institutional support and strategies for program implementation) as well as the program head at the main office and the co-director of the program (to understand the current status of the ECE strategy and support to centers in this region as well as their perceptions of the challenges ahead).

Instrumentation

To collect data from the various participants of the study, mainly three types of instruments were used: observations, interviews and a school readiness test. Table

1 provides an overview of each instrument type in relation to the research sub-questions. Thereafter, each instrument is described in detail.

Table 1: *Research questions and corresponding data collection instruments*

Focus	Observations of	Interviews with	Test on
Nano-Child	Attendance, retention		School readiness
Nano-Teacher	Classroom	Teachers, supervisors	
Micro-ECE center	Classroom Sub-region meetings	Field staff, teachers, supervisors	
Micro-Parent and community	Community meetings	Parents, community members, teachers, field staff	
Meso-Organization	Sub-region meetings	Teachers, field officer and program management	

Test. A school readiness test was conducted with 5-6 years old to understand their readiness for school in terms of cognitive abilities, concept development, number readiness, and language development. It was used to understand the current status of the learning outcome of children ready to be enrolled in formal school and the impact of the previous programs on the learning of children. The school readiness test has been adapted from the World Bank tool “Early childhood Education (ECE) program evaluation package” made for Indian preschool assessment in 2009. Major adaptation has been in transforming paper pencil tests to a kit of playful activities like using toys, objects and pictures to assess abilities and skills of children. For example, for testing the skill of the child to group things, the child is given a set of four toys (a toy car, a small top, a whistle and a ball); 4 objects used for studying (a pencil, a pen, a sharpener, an eraser). The child is allowed to play with them for some time and is then asked to group them into two groups, one used for playing and the other used for studying. A separate sheet is given to the evaluator to fill the appropriate response code. A test retest method was used to establish the reliability of the test. The spearman correlation coefficient value was high, that is, .77 as shown in Table 2.

Table 2: *Test Retest Reliability for School Readiness test*

Correlations

Spearman's rho	New_T1 Correlation Coefficient Sig. (2-tailed) N	New_T1	New_T2
		1.000	.777**
	New_T2 Correlation Coefficient Sig. (2-tailed) N	.	.000
		10	10
		.777**	1.000
		.000	.
	10	10	

** . Correlation is significant at the 0.01 level (2-tailed).

Observations.

The class observation tool was used to understand the current status of the ECE facilities, the class preparedness and the classroom processes. The class observation tool is adapted from the World Bank tool “Early childhood Education (ECE) program

evaluation package.” The tool was tweaked in terms of the scale and reorganized based on the literature review. The tool was then field-tested, tweaked twice in terms of readability and language to ensure good inter-rater reliability. The tool corresponds to the constructs of center facilities, classroom preparedness and classroom processes in the theoretical framework. The class observation tool is a closed ended tool with scale denoting occurrence (Yes/No/Not applicable) /frequency (sometimes, never, always)/ numbers (none, few, many) for various items. For example, for most of the questions for ECE facilities like is there a toilet and class preparedness questions like is there a daily plan or not, have Yes/NO/ Not applicable as answers. Responses for children factors like cleanliness, retention and familiarity with routine have been coded in terms of numbers like most/few/none. Classroom processes questions like ‘wherever required gives children time to think and respond’ are coded in terms of frequency like Mostly/Sometimes/Never. An inter rater reliability was conducted to ensure coherence between different observers. The intra class correlation coefficient value was strong, that is, Cronbach Alpha’s value = 0.85.

The sub-regional meeting observation was conducted to understand the current status of ongoing support to ECE teachers for implementation of ECE practices. This meeting observation tool included open-ended pointers like the nature, duration, and frequency of the meeting as well as the nature of relationship between the ECE teachers and supervisors. These observation notes were then coded to understand the actual status of ongoing support.

Interviews.

Semi structured interviews were conducted mostly in an informal way and in most cases without the use of audio recording instruments as they seemed to be obtrusive and intimidating to the participants like teachers, supervisors and parents. These interview schedules were based on the constructs in the theoretical framework. They were used with:

- ECE teachers, with an aim to understand the knowledge, skills and perceptions of teachers. Her perception knowledge and skills in ECE, perception of her role in ECE and towards training and ongoing support offered by (wherever applicable) were mainly explored
- Parents/ community stakeholders, with an aim to understand their perception about ECE and about the ECE center and the ECE teacher.
- Supervisors, with an aim to understand their perceptions about ECE teacher and her role in center as well as perceptions of their own role.
- Program staff, with an aim to understand their perceptions of the status of center as well as regarding the institutional training and ongoing support, previous support in the past one year, and the strategies for the program going ahead.

Data analysis

The classroom observation data as well as the school readiness outcome data was analyzed by quantitative methods while the observation of supervisor meetings and all the interviews with ECE teachers, supervisors, parents, community members and program staff were qualitatively analyzed. The classroom observation data for 36 sessions (18 classrooms x two sessions per classroom) were quantitatively

analyzed to present the current situation with regards to classroom practice. The classroom observation tool had constructs relating to three main factors namely the facilities (water & sanitation facilities, cooking & serving practices, cleanliness & organization), classroom preparedness (teacher presence, circle seating, availability of ECE material and daily plan) and classroom processes (teacher interaction, teacher response, classroom management and teacher predisposition). The coded responses for each of these constructs were averaged and the centers were then categorized in terms of high, medium and low based on the means in each of these constructs. A t-test was conducted to understand whether the differences between the centers with previous support and those without on the three parameters (facilities, preparedness and classroom processes) were statistically significant.

The interviews of ECE teachers and supervisors were not audio taped for the reasons of being obtrusive in building rapport and trust as most of them already thought we would report their situation to higher authorities. Similarly, as teachers were present in all parental and community members contact, these also could not be audio taped. Most of these interviews with teachers and supervisors were conducted in form of informal chats during tea or while walking home with them. Similarly most of the community meetings and parent interviews were conducted between informal chats about crops and village politics. Therefore there was heavy reliance on the field notes written after each parent visit, or community meeting or ECE center visit.

In order to come up with the initial coding scheme for each of the interviews (teachers, parents, community members) a few contact sheets for each of the participants were initially studied to look for common responses, patterns, views expressed by participants which were uncommon yet provided critical insights. A coding scheme based on these responses was prepared. This coding scheme got altered during the actual process of coding the interview responses as new themes emerged. The supervisor interview and meeting observation notes as well as program staff and management interviews were not coded, as they were very small in number to be coded.

Findings

Nano level

The first sub-question was, What is the current status of attendance, retention as well as school readiness outcomes of children? In both ECE-Is and ECE-Rs, the numbers of registered children per center were quite high, with an overall average of 60 children per center. This far exceeds the ideal class size of 20 children. However, actual attendance was different. In both ECE-Is and ECE-Rs, most centers had attendance levels closer to 20. Retention rates were high in both types of centers, with all children staying for the duration of learning activities at ECE-Is and most children staying for the duration of learning activities at ECE-Rs.

The results of the school readiness test indicated that about half of the children (51%) show language readiness, and 43% show number readiness. Cognitive abilities were less developed (25%) and concept development ranked the lowest (19%).

The second sub-question was, What is the status of current knowledge, skills and perceptions of ECE teachers towards ECE as well as their role in center? The teachers theoretically understand the importance of ECE. All of them said that

ECE is important for school readiness. All of them believe that the aim of ECE is to develop child socially, emotionally, mentally and physically to participate in school and to ensure smooth integration of the child in the school academically and socially. They consider ECE as the foundation for later school education and that a child well prepared here will cultivate a habit of sitting in a class, working with friends and teachers, building confidence to talk and socialize and will eventually face less problems in coping with school studies.

While the teachers do understand the importance of ECE, most of the teachers both in ECE-Is and ECE-Rs, ECE is associated with serving nutritious food, helping them cultivate habit of sitting in the classroom and teaching children songs, stories and games which aids their overall development. While they considered supplementary nutrition, formation of habits of hygiene and eating, sharing, playing with peers as important part of education, they had limited knowledge about how to help children develop cognitive abilities, language development and number readiness. Activities for these did not feature as a part of the conversation on ECE. Also, very few could actually give an example of how a particular activity leads to development of particular skill in children. However, in five out of nine ECE-Is, activities with regards to some of these areas of development were observed and the teachers were able to relate the activity to the kind of development it fosters.

The classroom observation confirmed this. In most of the centers, including half of the ECE-Is, almost no activity or random activity limited to play, songs and stories were conducted. Many centers started late and by the time children and teacher gathered, it was time to serve food. And by the time food was served and eaten by children, it would be time to go home and slowly children would start to disperse. Some teachers tried doing some activities because of presence of the researcher or the field observers there. However there was no planning or schedule or class preparedness and therefore activities were conducted according to what she knew which were limited to singing songs, play or asking children to say their names and poems one by one. Only few could link the activity they did to how it aids development of skills and behavior. For example, free play helps in physical development or picture stories help children listen, think and respond.

Teachers perceived their own role in the centers relating to nutrition, health, and community contact, administrative and teaching responsibilities. Thus ECE featured in their list of responsibilities. However, only five ECE-Rs teachers said that it is an important part of their work or they enjoy it or it is their duty. Many teachers complained that because of personal, family and data as well as health and nutrition responsibilities, the role of the teaching remains the most neglected area and that they aren't able to take classes regularly. A few of them had additional responsibility of another center (teacher was on leave or the teacher position was vacant) or of a helper (helper was not present), which left no time for them to engage in teaching practices. One of them reported, "There is so much data and health related work, that even if we want to, we cannot do ECE work. Distributing take home rations takes 2-3 days, 2 days for health check up and vaccination, measurement of height and weight of all children and creating gradation charts takes another 3-4 days. Therefore ECE cannot be undertaken regularly. Whenever there is time, we take it." Finally, most of them reported that irregular and less number of children decreases the motivation to teach, as one has to keep repeating, as they are slow to pick and tend to forget fast. However, two of them said that they cannot teach when the class

is overcrowded as it becomes difficult to manage many young children together with little help from the helper.

Micro level

The third sub-question was, What is the current status of ECE facilities, classroom preparedness as well as teaching/learning processes in the ECE centers? The current status of the ICDS classrooms was studied through structured observation. Each center was contacted and then visited for two consecutive days to observe the classroom setting, teacher-child interaction and the situation of ECE in that center. The observer made notes during the visit, and completed the classroom observation tool immediately following (to limit obtrusiveness). Table 3 summarizes the findings related to facilities, classroom preparedness and teaching/learning processes. Using a paired t-test, the differences between the ECE-Is and the ECE-Rs was ascertained to be statistically non-significant for center facilities ($p > 0.05$), but statistically significant for class preparedness and classroom processes ($p < 0.05$).

Table 3: *Current status of ECE centers*

	ECE-Is	ECE-Rs
Facilities	Seven out of nine centers had a medium score in facilities for water and sanitation, clean cooking and serving practices and cleanliness and organization. Though ECE-Is performed slightly better than the ECE-Rs	Seven out of nine centers had a medium score on facilities for water and sanitation, clean cooking and serving practices and cleanliness and organization. Other two centers scored low.
Classroom preparedness	Seven out of nine centers scored medium and high in teacher presence in the classroom. All centers scored high in circle seating arrangement. All centers scored medium to high in terms of availability of ECE material. Eight out of nine centers scored low on daily planning.	All nine centers scored medium to high on parameter of teacher presence in the classroom. Most centers scored low on circle seating arrangement, presence of a daily plan and ECE material for teaching learning.
Teaching/ learning processes	Overall the ECE-Is scored medium on all parameters of classroom processes like teacher interaction, response and relationship with children as well as management of classroom. ECE-Is performed better than ECE-Rs in all these parameters.	Overall ECE-Rs had a medium score in teacher interaction, response and relationship though they scored less than the ECE-Is. ECE-Rs overall scored low on management of classroom processes.

The fourth sub-question was, What are the current perceptions as well as support from parents and community towards ECE as well as center and ECE teacher? The In order to understand what parents and respected community members think of ECE, role of the teacher and the center were discussed in parental interviews, parents meetings and interviews with the influential members in the selected villages. Interviews were only conducted with parents of regular children, as they would be able to tell more about the status of ECE and its impact on their children. The results show that though parents are aware of the importance of ECE and have strong opinions on what AWW should teach; they are ambiguous about their role in ECE as they consider this a primary responsibility of the center and teacher. They see

center as primarily providing meals, health checkups and immunization. Similarly, influential members of the community understand the importance of ECE, yet the kind of support offered by the community to center and the teacher is restricted to infrastructure. These findings are summarized in Table 4.

Table 4: *Current status of parent and community perceptions of ECE, the center and the teacher*

	ECE-Is	ECE-Rs
Parents' perceptions and knowledge about ECE	Most of the parents in ECE-I villages perceived ECE as important for school readiness. However their knowledge and association with ECE was limited to reading and writing alphabets and numbers, learning songs and games. Few of parents in one ECE-I community expressed negative attitude towards education and ECE.	Most of the parents in ECE-R communities perceived ECE to be important for school readiness. They send children to center to prevent them from roaming around and to help them develop some social skills and habits. However, their knowledge of ECE is limited to reading, writing, counting, and knowing tables, songs and games.
Parents' perceptions of the center and the teacher	Parents perceive center as health, nutrition and education center. Parents gave a mixed response to the center. While some were satisfied with the services and ECE at the center, in other few villages parents expressed dissatisfaction with quality of all services including ECE. Their participation is limited to prepare child for the center or drop or pick them up at the center or asking few questions about what they learnt at the center. Some of the parents (in two ECE-I villages where ECE is active) are aware of changes in their children as a result of going to center. These changes are related to eagerness of the child to go to the center, imbibing good habits and social development.	Most of the parents see centers as feeding center, health and vaccination center and a center where children get ECE (i.e. songs, games and habit of sitting and working with peers). They expect the center to teach them counting till 100, teach them how to speak confidently, read and write. Some parents believed that currently the center fails to fulfill this.
Respected community members' perceptions and support	All influential members considered ECE as important for school readiness and to help children become 'clever' and 'intelligent'. Mixed responses in terms of their perception of the center and teacher working. Some were satisfied and gave positive responses about the center, while others were unhappy and dissatisfied with the way the teacher worked. Most support offered was in terms of infrastructural help	Most influential members consider ECE as an important foundation for overall development and school readiness. Most of the influential members not happy with the lack of ECE activities at the center. Support offered to center from the village is mostly in form of infrastructural help.

Teachers' perceptions of community and parent support	A few ECE-I teachers were positive about community support, whereas most of the ECE-I teachers experienced lack of support from the parents in terms of childcare, regularity and attendance of children.	Most teachers, except two, experienced lack of support from the parents. They perceive that parents cooperate when they are in need. Reasons for non-cooperation was lack of awareness of ECE and their role in it as well as their work stresses.
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Meso level

The fifth sub-question was, What is the current status of institutional and organizational factors which influence (enhance or inhibit) ECE teacher ability to implement child centered curricula? The actual status of institutional support provided by supervisors was studied through direct observation of sub-regional meetings. Additionally, the supervisors observed were also interviewed to know their role in the overall system and in the specific centers, as well as their perceptions of the teacher's role in the center. Further, an interview with the program's field officer who worked with supervisor as well as instructors conducted to understand his perceptions about both the training and the supervisor support to the teachers for implementation of ECE in the centers. The current status of program support to teachers was understood in terms of the perceptions regarding: role of teacher; role of supervisor, and the actual nature of ongoing support as well as perceptions and expectations for future training. The findings are summarized in Table 5.

Table 5: Current institutional and organizational supports and barriers to implementing child-centered curricula

	ECE-Is	ECE-Rs
Training for teachers	The program has trained 19 centers through three five day trainings and continuous on ground support for ECE related issues.	One month in service training as soon as they join as teachers. Refresher training for seven days every two years. Training disconnect with field reality, in lecture mode and non participative. Mostly focus on building capacities for administrative, community work.
Ongoing support	The program support has been at two levels. At the district level the program has worked with the program instructors to build their capacities in make training methodology participative, helping them build four centers as models for trainees to see as demonstrations of good practice and by providing training curriculum and materials	Ongoing support for ECE minimal. ECE is not a priority as compared to health and nutrition. Supervisors do not see teachers as implementing ECE owing to other workload. ECE not in the sub-regional meetings, supervisor visits or accountability systems. Most of ongoing support on data, health and nutrition related work and in top-down instruction fashion.

<p>Teacher perception towards training and their learning needs</p>	<p>Most teachers have found training to be useful in understanding ECE through simple, easy to do activities and low cost materials. A few have found training to be too detailed to be implemented in their context.</p>	<p>Teachers find training repetitive and boring. They want easy to do activities, material and curriculum support as well as continuous guidance from an expert on the implementation of ECE in their classroom</p>
<p>Moving forward</p>	<p>In expanding to other centers, program management plans to increase on ground support through creating block resource teams consisting of existing supervisors and program block level staff. These staff will provide technical help as well as will be key agents to influence and motivate supervisors and teachers to bring ECE back on agenda. Moreover their role will be pivotal to initiating community participation model in the selected villages to strengthen the community-center linkage. The program has planned a series of trainings for the block resource team as a whole group on ECE, training methodology, community participation, influencing skills to build and strengthen the capacities of block level staff as well as supervisors so as to be able extend technical and other support to teachers.</p>	

Discussion

Conclusions This study was aimed at understanding the current situation of ECE in the centers, the personal and professional characteristics of the teacher and contextual (community and institutional) factors which influences their ability to implement developmentally appropriate practices. From the findings of the study, it can be concluded that there is weak enactment of ECE in most of the centers. Various factors at various levels (nano, micro, meso) hinder this ability to enact.

At the nano level, most of the centers witnessed average attendance of 15 children on both days, which is near to the ideal class size of 20 children and most of them stayed at the center for the entire duration, contrary to what teachers reported. The school readiness results reveal a relatively high score on language and math areas and low score on cognitive and conceptual areas of development.

Also at the nano level, the findings about teacher characteristics show us that though ECE teachers perceive the importance of early childhood care and education as being critical for further development and schooling. Moreover they seem to possess adequate theoretical knowledge on child development, early childhood education though their knowledge and repertoire of ECE activities was limited. Additionally their perception of their role in the center was focused mainly on administrative, health and nutrition related work. Daily planning, material preparation and other tasks related to education were missing in most of the ECE-Rs as well as ECE-Is. As a result, the current enactment of systematic developmentally appropriate practices was almost negligible. Even in ECE-Is, where developmentally appropriate ECE curriculum, material, training and ongoing support for enactment was available, only about half of the teachers demonstrated some ECE. However, most teachers showed a willingness to take on this role if provided with adequate support and training. Most of the ECE-R teachers wanted to learn new, simple and easy to do activities with children in their classroom, which could engage them. They wanted to learn

new songs and games for teaching numbers and alphabets. Along with training, they wanted more ongoing support and feedback in their classes by a supervisor or a technical expert.

Findings from the class observations at the micro level suggest that the basic infrastructural facilities is sufficient though the processes like clean sanitation and water facilities or cooking and services can be improved. The differences between ECE-Is and ECE-Rs are not significant ($p > 0.05$). With regards to centers being prepared for ECE activities (availability of ECE material, curriculum and daily plan, seating arrangement for children) ECE-Is performed slightly better than ECE-Rs. The differences were found to be statistically significant ($p > 0.05$). Similarly, the teaching learning processes including the teacher child interaction and relationship were slightly better in ECE-Is than ECE-Rs and the difference was statistically significant ($p > 0.05$). This means that the current program interventions in ECE-Is have brought about some positive changes with regards to teachers engaging more in ECE preparation and enactment related activities.

At the micro level, with regards to parental and community support, the findings suggest that though parents are aware of the importance of ECE, they often don't know what it entails in daily practice. This lack of awareness about ECE is reflected in their naive expectations like their child being able to count till 100 or say mathematical tables till 10 before he enters grade one. The findings further reveal that they have limited engagement with their children at home regarding ECE related activities and are unaware of their role in ECE at home and at the child care center. They perceive the center as a health and a nutrition center mainly and perceive the role of the teacher mostly as a person who calls children for some activities at center, gives the government allocated ration and arranges for health and vaccination of mother and child. However, in few ECE-I villages where ECE was active, parents were positive about the teacher and the impact of the ECE process on their children's habit and social development. However, most of the teachers perceive a lack of support for their work, especially ECE work from the parents and the community. Overall they view some parents as uneducated, unaware and difficult to change. Interestingly, findings from parents reveal that parents know the importance of ECE.

Findings at the meso level show that the institutional support in terms of time, technical and human resources for teachers to enact proper ECE as well as seek parental support for ECE is absent. Findings reveal that ECE is not a priority for the regional office, especially owing to the fact that the region is infamous for highest rates of child deaths and malnutrition. This is reflected in the accountability system and the allocation of time and resources for strengthening ECE practices. Minimal accountability is expected from teachers, supervisors and field staff for ECE. Similarly, trainings are centralized, disjointed from the realities of the ECE classrooms, mostly in non-participative, lecture based format and held for a very short duration every two years. Ongoing support from the supervisor is for data collection and the perception of the teachers overall is that of an administrative, implementer of health and nutrition services at the village level. The program's focused support in form of training and on field coaching has lead to some changes in the implementation of ECE in ECE-Is, yet the regularity of enactment remains weak, precisely because lack of ownership and focus for ECE at the meso and micro level. As the program expands into other villages, it seeks to bring ECE back

in focus through intensive work with the supervisors, decentralization of training and ongoing support as well as through initiation of community accountability and support systems.

Thus, to conclude, the study started with the main research question about the current status of the ECE practice in the centers, the individual and contextual factors responsible for this current situation. The study concludes that the current status of ECE practices overall in most ECE centers is weak, though in ECE-Is it is slightly better than ECE-Rs. However, in absence of teacher identity and capacities as an ECE educator along with lack of support from parents, community, supervisor and regional offices are main reasons, which hinder teachers from enacting ECE practices in their classrooms.

Recommendations for further research

The current study opens up new questions and areas for further research. The findings reveal that ECE enactment is weak. It further reveals lack of technical capacities as well as willingness of the regional office to refocus on instruction. A research which informs the design of capacity building for the ECE teachers, the supervisors and the regional staff at a large scale possibly using the plan-enact-reflect model can be valuable to both the project as well to understand the process of educational change in the area of large scale public preschool education. Further, the study reveals the lack of awareness and participation of the parents in preschool education because of personal, school and contextual factors. Research and development efforts are needed to improve community and parental participation in monitoring of the centers and improving parental awareness and participation at home.

Final remarks

This study was undertaken to understand the needs of the ECE teachers, the current status of child care centers in a tribal region of India, as well as the individual and contextual factors which influence ECE teacher abilities to enact child centered ECE practices in their classrooms. Guided by a theoretical framework, which focused on examining individual factors at the nano level, the instructional and the local community context at the micro level and the institutional as well as organizational setting at the meso level, this study shed light on the enabling and hindering factors for ECE teacher capacity building. The study investigated ECE-Is (with ongoing program interventions) and ECE-Rs, (new centers where program plans to expand its program). Findings reveal that ECE enactment is weak in most of the ECE-Is and ECE-Rs. The local community as well as the institutional context is not conducive for teachers to implement systematic ECE on a regular basis.

The current study on understanding the hindering and enabling factors to strengthen teachers capacity to implement ECE practices is rich in terms of understanding the social as well as the institutional context within ECE, how it operates and its impact on teacher capacities and motivation to implement innovation. Further, the study is unique as it in its attention to rural centers that have received some support and those that have not. Furthermore, it provides rich evidence regarding the socio-cultural context of the early childhood education and the quality and nature of the home-preschool link. This study informs immediate practice at the ECE program and regional office through providing empirical evidence about the enabling and hindering factors and therefore possible interventions which could be continued,

new opportunities as well as potential threats of some of the key policy/ strategy decisions.

Secondly, from the larger national policy point of view, this study provides empirical evidence to advocate improvement in quality through improvement in accountability systems, decentralization and contextualization of decisions regarding timings, curriculum et al and learner centered capacity building of the regional staff. It demonstrates how a public- private partnership could be a great opportunity to bring in momentum as well as technical expertise and resources to do it.

Thirdly, this study informs the work conducted international aid agencies providing financial and technical support to such public large-scale welfare programs. This study belongs to the class of phenomena of ECCE in developing nations and the under resourced context. This study holds significance in area of early childhood education improvement, teacher professional development and improving parental participation in early childhood practices at home as well at preschool. While, the area of early childhood education is vast, scientific knowledge creation for programs such as these is limited and restricted to United States (c.f. Head Start, Perry Preschool Project, Carolina Abecedarian Project). Most of the work done in under-resourced developing countries context such as sub-Saharan or the Latin American regions are through international organizations with their own system of evaluation and study and the results of which are not usually made public. Thus, in addition to the findings, a key scientific contribution of this study is the provision of a theoretical framework which could inform such work relating to teacher professional development and systemic improvement elsewhere.

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Revamping of Higher Education Institutions in Namibia: A case study of teaching Public Administration and Management from colonial occupation to independence

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Abstract: The original teaching and learning of the academic discipline 'public administration and management' started with the establishment of the Academy for Tertiary Education in 1980, whose main aim was to make tertiary and out-of-school education available to the people of Namibia. The Academy was affiliated as a tertiary institution under the UNISA statute and the Joint Statute of Universities in South Africa. After independence in 1990 the Academy was transformed into the University of Namibia and Polytechnic of Namibia. Currently, the Polytechnic of Namibia has been transformed into the Namibia University of Science and Technology. The teaching and learning of Public Administration and Management over the last 25 years have grown tremendously in terms of numbers and outcomes. Courses have been Namibianised and developed to meet unique local needs and expectations of a modernizing, knowledge-based economy. A flexible approach in the teaching and learning of the discipline on full, part-time, and distance education mode has made it possible for students throughout Namibia to enroll for the course.

Keywords: Revamping higher education institutions; Public administration and management.

Introduction

This article focuses on the revamping of higher education institutions in Namibia and how the teaching of the academic discipline of Public Administration and Management has been reformed from colonial times to independence. In this regard the evolution of higher education in Namibia will be explained with the focus on the discipline Public Administration and Management. Thereafter, the teaching of the discipline Public Administration and Management is evaluated.

From Colonial Occupation until Independence

In 1884 when it was high fashion in Europe to colonize Africa, Germany annexed the South West Africa territory, with the exception of Walvis Bay and a few islands in the region. Walvis Bay, which had been incorporated into the Cape Colony by the British Government on 12 March 1878, remained South Africa territory when the Union of South Africa came into being in 1910. South Africa appears on the Namibian scene when its troops occupied the territory in 1915 during World War I, as an Allied Power following the German surrender at Khorab (Maree, 1989:9). South Africa was granted guardianship over the territory after the signing of the Treaty of Versailles in 1919 and the subsequent establishment of the League of Nations. In 1920 a C-class mandate over Namibia was granted to South Africa by the League of Nations in accordance which South Africa could administer South West Africa as an integral part of its territory. Events started taking a different direction with

the formation of the United Nations (UN) in 1946. South Africa was accused by the international community that its mandate over South West Africa was no longer valid. The UN declared Namibia a trust territory with rights of self-determination, but South Africa refused to acknowledge this. In 1966 the UN revoked South Africa's mandate and set up a council with authority for the territory. South Africa resisted all pressures from the UN General Assembly and continues ruling the territory. As part of the South African policy of "apartheid", segregation and discrimination were intensified inside Namibia through efforts by the National Party government to extend the South African apartheid system in the territory.

To oppose apartheid and to agitate for independence, Namibians formed a number of political, cultural and student organisations, including the Ovamboland People's Organisation (OPO), which in 1960 was transformed into a fully-fledged national movement, called the South West Africa People's Organization (SWAPO). Resistance to South Africa's domination began in the 1950s. Many Namibians went into exile. In 1966 the armed struggle began, with guerrilla attacks on South African forces in Northern Namibia. The armed struggle intensifies and continues over the next 20 years (IDAF, 1989).

International pressure for Namibia's independence became stronger and diplomatic negotiations intensified. Pressure was put on the South African government to accept the UN resolution 435, which called for the holding of free and fair elections in Namibia, under UN supervision and control, as well as the cessation of war, by all parties. After an 11 month UN monitored transition period, Namibia gained independence on the 21st March 1990, after 106 years of colonial rule. However, the years of colonial rule, left an indelible mark on the face of the country- socially, economically and environmentally (Vision 2030:29).

Educational Challenges since Independence

When Namibia became independent the main task of the Namibian government was to address the multifaceted and complex tasks of national reconstruction and development. The success of these undertakings by the Government of Namibia depends heavily on its education system; education became a central priority of the Namibian Government. Namibia is a large country with a very unevenly spread population. Moreover, its previous education history has led to an equally uneven distribution of tertiary qualifications among its different communities. In addition, the institutional infrastructure at tertiary level that could permit a part-time alternative simply does not exist throughout the country, especially in the northern part of Namibia where the previously most disadvantage and majority of the people live and work. The challenge for the new government has been to reconstruct the structure and ethos of the education system.

At independence, Namibia inherited an education system that was characterised by gross inequalities in the allocation of resources to schools for different ethnic groups. However, the country's unique geographical circumstances, namely a surface area of 823,000 square kilometers, with a population of 2, 085 927 million (Namibia Statistics Agency, 2013) which is unevenly distributed over vast distances have posed additional barriers to overcoming this legacy of unequal access. Furthermore, the country cannot afford to release large numbers of its professional, managerial, and para-professional staff for extended periods of in-service full-time training

or upgrading (Ministry of Higher Education, Vocational Training, Science and Technology, 1998). Such a strategy for redressing inherited inequities would prove too costly and too disruptive to daily activities.

Numerous published studies of Namibia by various government agencies since independence 25 years ago have highlighted the shortage of educated skilled and experienced human resources in the Namibian labour market. According to official statistics, Namibia's population is dominated by young people, with over 45.7 percent below the age of 19 years (Namibia Statistics Agency, 2013: 4). In recognition of the central role of education and training in the process of national development, the Namibian government has allocated vast amounts of money for primary, secondary and higher education.

As far as higher education is concerned, the Namibian Government has passed the Higher Education Act, 2003 (Act No. 26 of 2003), providing an umbrella to the existing University of Namibia and Polytechnic of Namibia Acts, and has defined the role of the Ministry of Education, and other stakeholders in higher education. The Higher Education Act also established the National Council for Higher Education (NCHE), to advise the Ministry of Education on the strategic requirements of the higher education system. The NCHE will also recommend priorities on completing claims for resources, development, coordination, productivity, efficiency and accountability of higher education institutions. Lastly, the NCHE will monitor and evaluate staff development and management policies of higher education institutions; the administration of subsidies to higher education institutions in accordance with the proposed funding formula (Vision, 2030: 29).

History and Evolution of Higher Education

A discussion on the transformation of the Namibian higher education landscape is necessary to provide an understanding of the concomitant higher education challenges. When Namibia became independent there were three different paths to education beyond secondary school. Some students continued their education in the institutions of other countries, both within the region and in more distant settings. A large number of students studied through the distance education mode, while others were obliged to spend years outside of the country. Some young people left the country to join the liberation struggle, while some other students studied at institutions in neighboring countries such as Zambia, where institutions been created to address the needs of Namibia, for example, the United Nations Institute for Namibia in Lusaka. Within the country the Windhoek College of Education was created to prepare teachers for the white community, however, it functioned well below capacity. Black teacher training colleges established within the country had more limited resources and were inadequate to meet the needs of the population. The discussion which follows gives an overview of the development of higher education teaching and education before and after independence. This discussion is based on the fact that the higher education sector comprises several academic disciplines, including Public Administration and Management.

Academy for Tertiary Education

The first institution of higher learning in Namibia was created before independence with the founding of the Academy for Tertiary Education in 1980 under The

Academy For Tertiary Education, 1980 (Act No. 13 of 1980) that made tertiary and out-of-school education available to the people of Namibia. The Academy, as it was commonly known, started with three staff members and one office in the heart of Windhoek, the capital city of Namibia. The Act did not allow the Academy to function act as an autonomous university with the ability to confer its own degrees and professorships. Rather, a formal agreement was reached between the University of South Africa (UNISA), one of the leading distance education universities in the Southern African Region. According to this agreement the Academy was recognised not only as an acknowledged tertiary institution under the statute of UNISA, but also by the Joint Institute of Universities. The Academy was designed to be a unique institution of higher education, with regard to both qualification and organisational structure. The Academy had to compete with well-established South African institutions of higher education to attract students to their programs. Furthermore, the Academy has to suffer because of the government policies and academic boycotts aimed at the South African Government and its apartheid policy.

The Academy began to offer teacher training diplomas in 1981, in association with UNISA. Because the diploma courses awarded were UNISAs, the syllabi, curricula and study materials, assignments and examination, with a few exceptions, were those set by UNISA. In a minority of cases the development of the Academy's own curricula, syllabi, etc. took place with the consent of UNISA. Apart from the technical and traditional courses, the "university component" of the Academy was originally only a teacher training division. The inclusion of degree courses in the diploma programs necessitated the offering of such courses in agreement with UNISA.

The organisational structure of the Academy was integrated with clusters of related subjects being taught under certain "Sections", e.g. Education Section, Languages Section, Business Section, etc. These sections formed the primary managerial and academic units and staffing structures. When the Academy gained autonomous status in 1986, most of the sections were converted into faculties, e.g. the Faculty of Arts was formed by the combination of four sections. Sections, in which traditional programs were offered, became curriculum groups. Technical sections remained the same (Academy Jubilee 1990).

On 20 September 1985 a new Act, the Academy Act, 1985 (Act No. 9 of 1985), was signed by the then Administrator- General after being accepted by the National Council of the Transitional Government of National Unity. This event marked an important shift in the objectives of the institution, as it transitioned from an institution training mainly teachers, with a special and intensive interest in general education to a multi-purpose institution with varied lines of specialisation, of which many were career orientated. Furthermore, where the institution was previously obliged to use UNISA curricula and syllabi, because it awarded the degrees, the Academy now obtained its own examination and certification powers. This new development led to the introduction of a vast number of new courses and programmes. This new development also allows the Academy to offer courses and programmes on the distance education mode.

According to the Academy Act, 1985, the newly established autonomous institution was now entitled to offer tertiary education, as well as out-of-school training. In October 1987 the three components were officially named:

- The University of Namibia;
- The Technikon Namibia; and
- The College for Out of School Training (COST).

In 1988 the first official heads of the three components were appointed. Furthermore, each of the three components established its own faculties, curriculum groups and sections to offer programmes and courses. An agreement was reached between the University component and UNISA for the use of academic material and the moderation of examinations by UNISA. In this regard the Faculty of Economics and Management introduced a number of degree programmes such as the three years Bachelor of Commerce, Bachelor of Economics and the Bachelor of Administration, which focus mainly on the training of students in the discipline Public Administration.

The Technikon component also introduced a number of new “faculties” called Curriculum Groups. Each of the curriculum groups was granted the right to offer certificates and diplomas. The focus was based on practical and career-oriented training and education. The Curriculum Group Management and Administration offered two National Diploma courses, namely, the three year National Diploma in Personnel Management and the three year National Diploma in Public Administration. The three year National Diploma Public Administration was developed in collaboration with the former Technikon Pretoria, currently Tshwane University of Technology (TUT), and the Central Personnel Institution (CPI), of the Transitional Government, and specifically the Department Training within the CPI, who was responsible for all staffing issues within the Transitional Government Administration. The purpose of the Diploma in Public Administration was to train public officials for the Transitional Government and an independent Namibia. The arrangement with Technikon Pretoria was that they will moderate the examination scripts for the interim period. The importance of this development and arrangement was that for the first time, the content for the Diploma in Public Administration will be offered by Namibians for Namibians on local soil.

The third component of the Academy was the College for out of School Training (COST). The main focus of COST was to provide vocational training to students to meet industrial needs and specifically to cater for a group of students who do not qualify for entrance to a technikon or university. The academy was structured in such a way that a person could enter COST and work his/her way towards a degree at the university.

The main criticism against the Academy was that it was perceived as an institution that served ulterior motives, especially the apartheid South African regime and the Transitional Government of National Unity’s agenda. Further criticisms labeled against the Academy were:

- Very weak representation of Namibians from disadvantage communities amongst the academic and administrative staff;
- Relatively small number of lecturers with PhD degrees;
- Very low levels of research and publication productivity amongst the majority of academic staff; and
- Gross inadequate library holdings, in terms of number of books, journals, periodicals and subject coverage (University of Namibia 1995).

Besides this criticism, the Academy was the first local institution of higher learning established within the country to address the needs and demands for a skilled labor force in Namibia. Furthermore, the Academy had laid the foundation for the establishment of the University of Namibia and the Polytechnic of Namibia.

After Namibia became independent in 1990, the Namibian government appointed a Presidential Commission on Higher Education, composed of local and international scholars to address issues of concern regarding higher education in Namibia. The Presidential commission submitted its report in September 1991 and recommended that the former Academy be dissolved and that a new national university and a polytechnic be established. The Commission furthermore recommended that higher education in the country should be coherent and responsive to national development goals, needs, and employment requirements, especially taking into consideration the imbalances and malpractices of pre-independence regimes.

The University of Namibia

His Excellency the First President of the Republic of Namibia, Dr. Sam Nujoma, appointed Vice-Chancellor-Designate, Dr. Peter Katjavivi, to initiate the planning and development of the new university. Soon thereafter the Vice-Chancellor-designate established a Transitional Planning Team to assist him in this task. A Joint Technical Committee of Cabinet, comprising personnel from the Office of the Vice-Chancellor-Designate and the Ministry of Education and Culture, was established to study and evaluate the various recommendations in the Turner Report on Higher Education. The recommendations of the Technical Committee were adopted by the Cabinet in November 1991. On August 4, 1992 the University of Namibia Act, 1992 (Act No.18 of 1992) was promulgated by the National assembly, and became operative on August 31 of that year. His Excellency the First President of Namibia, Dr. Sam Nujoma, was appointed the founding Chancellor and Professor Peter Katjavivi as the first and founding Vice-Chancellor. The university act affirmed the autonomy of the University of Namibia (UNAM) and its commitment to the spirit and letter of free academic inquiry. The act stressed the intention of UNAM of be responsive to the social, economic, cultural, scientific and academic needs of Namibia. Indeed, UNAM's motto is "Education to Serve Development" (University of Namibia 1995). The university administration also decided to reform and restructure tertiary training and education in accordance with the proposals of the Presidential Commission. UNAM's governing structures includes the Council, its supreme policy-making body, the Senate, which is responsible for the academic component of the institution, the Vice-Chancellor, its chief academic and administrative officer, and a Student Representative Council.

Currently the University of Namibia is the leading public, higher education institution in the country. With a student population of close to 25 000 students each year, academic programmes at the University emanate from eight faculties and two schools. To meet the educational needs of a diverse nation, UNAM has 12 campuses and 9 regional centers country-wide, the latter of which are managed by the Centre for External Studies, the distance education unit of the University. These dynamic and committed faculties and competent administrative support staff have earned UNAM a ranking as one of the top African universities. To date UNAM has graduated over 17,000 students who are serving the country in various sectors of the economy with most occupying prominent positions in government

and the private sector (University of Namibia Annual Report, 2012). The Faculty of Economic and Management Science currently house 5 departments, including the Department of Political and Administrative Studies. Currently, the Department offers the following undergraduate and post graduate programmes related to the study of Public Administration:

- Diploma in Local Government Studies, a two year programme;
- Bachelor of Public Management (Honors) degree to prepare students for careers in management of business firms, the public service or other non-profit seeking organisations by providing conceptual, human and technical/operational knowledge and skills;
- Master of Arts in Political Studies (M.A. Political Studies);
- Master of Public Administration (M.Admin); and
- PhD in Public Administration or Political Studies (University of Namibia, Faculty of Economics and Management Prospectus 2015).

Transformation of Polytechnic of Namibia into Namibia University of Science and Technology

The Polytechnic of Namibia (PoN) has its roots in the establishment of the Academy. Classes in vocational, teacher and secretarial training started in January 1980. Five years later, in 1985, the technikon component of the Academy offered a total of 17 diploma and certificate programs in agriculture and nature conservation, personnel management, public administration, cost accounting, secretarial training and communicative and legal training while COST offered a total of 13 certificate programs in technical, commercial and pre-tertiary teacher education.

Although the Presidential Commission on Higher Education recommended the establishment of two institutions of higher learning, only UNAM came into existence in 1992. This implies that the administration and management of both the technikon and COST were placed under the auspices of the new university until the promulgation of the Polytechnic of Namibia Act, 1994 (Act No. 33 of 1994). Two years later, in 1994, the PoN was established and in terms of the Act the technikon and the COST merged to become the Polytechnic of Namibia (PoN). The first Rector Dr. Tjama Tjivikua was appointed on 04 August 1995, and the first meeting of the Council of the PoN was held on 10 August 1995. This event accelerated and completed the delinkage of the two institutions of higher education in December 1995. The PoN thus became an independent and autonomous institution in January 1996. The PoN's governing structures includes the Council, its supreme policy-making body, the Senate, which is responsible for the academic component of the institution, the Rector, its chief academic and administrative officer, and a Student Representative Council.

The mission of the PoN is to contribute to Namibian development by providing tertiary technological career-oriented education at internationally recognised standards. The instruction programmes of the PoN are therefore aimed at meeting the needs of industry. With emphasis on the transfer of technology, the PoN gives due regard to the professional human resources requirements of the country and those of the region and beyond. The PoN Act also provides for the gradual phasing out of vocational training courses and the granting of degrees by the PoN. The

student enrolment profile of the PoN demonstrates a very wide diversity of teaching programmes. The PoN's commitment is to working hand-in-hand with business, industry and the government to provide courses to meet the demands of a changing workforce. This has resulted in a large and varied range of programmes. These include full-time, part-time and distance education programmes. Currently the PoN has a student population of close to 12000 students. The academic programmes at the PoN reside in 8 schools.

To meet the educational needs of a diverse nation, the PoN has 9 regional centers country-wide, the latter of which are managed by the Centre for Open and Lifelong Learning, the distance education unit of the PoN. To date the PoN has graduated over 17,000 students who are serving the country in various sectors of the economy with most occupying prominent positions in government and the private sector (Polytechnic of Namibia Annual Report 2013).

With reference to the teaching of Public Administration as an academic discipline, the PoN continued with the teaching of the three-year National Diploma in Public Administration until 1998, when it was revised and replaced with the three-year National Diploma in Public Management. The Diploma was revised to adhere to new developments within the Namibian Public sector and to contribute to capacity development. In 2002 a new four-year Bachelor of Technology Degree (B.Tech) in Public Management was introduced to replace the National Diploma in Public Management. However, the new B.Tech Public Management Degree was based on the new developments in South Africa with the introduction of B.Tech degrees at the former technikons. The B.Tech Public Management Degree was a Namibianised product developed to deal with the new challenges faced by an independent Namibia. The PoN adopted a policy that all curricula be revised after three years and that an inclusive curriculum approach is used in designing and evaluating of qualifications offered by the institution. In this regard the B.Tech Public Management Degree qualification is being phased out and replaced with a three-year Bachelor Degree in Public Management, implemented in 2010, and a one-year postgraduate Honours degree in Public Management. The Bachelor of Public Management Degree places emphasis on leadership in the varied, complex and challenging settings of public action – such as multilevel policy, governance and management processes, hybrid social enterprises, or partnerships. The Bachelor of Public Management Degree is geared towards providing grounding in the advanced concepts and frameworks of public management and to develop capabilities in the advanced tools and skills of public management. The Bachelor of Public Management Honours Degree is a post graduate qualification with the purpose of enhancing knowledge of the changing dynamics of public policy and management and to expand the conceptual and practical skills for taking national, regional, international perspectives on public management into consideration. The programme furthermore facilitates critical thinking about multi-national organisational and institutional developments on the central, regional and local levels of the public sector in Namibia. This new development is in line with Vision 2030 and the National Development Plan 4, to ensure that Namibia becomes a knowledge based society. Provision is also made for the Department to offer a Master and PhD program in Public Management in the near future.

In 2013 the Government of Namibia has granted the PoN the right to transform the PoN to the Namibia University of Science and Technology (NUST). This renaming is in line with international practices because the name Polytechnic placed a limitation

on meeting the realities of a constantly changing global economy. According to studies conducted in developing countries, there has been a significant investment in science and technology education, particular at the university level. Sustainable development requires expert knowledge in various fields, a broad skills base and the capacity to generate and apply new knowledge, innovations and inventions. The PoN fits well into the sphere of modern universities, and its transforming and renaming has become necessary for Namibia to remain competitive in the global arena, and thereby conform to global standards. The transforming of the PoN to NUST will ensure that Namibia achieves the goals set in Vision 2030 (Polytechnic of Namibia 2012). The establishment of NUST will also lead to some organisational changes. In this regard schools will be renamed as faculties, and some departments will be merged. In this regard the Department of Public Management has merged with the Department of Legal Training and become the Department of Social Sciences within the new Faculty of Humanities. This development will lead to new challenges and opportunities for the study of Public Management. Since the inception of the PoN student enrollment figures has increased drastically. The reason for this increase is because new qualifications have been introduced to meet the need of industry and society, as well as the high demand amongst learners who completed high school and qualify for higher level training.

Assessing the Public Administration and Management Curriculum since its Inception as an Academic Discipline in 1985

In order to understand the importance of assessing the Public Administration and Management curriculum in Namibia, it is important to give a brief history of the discipline in Namibia. When the Academy approved the offering of the three National Diploma in Public Administration in 1985, in collaboration with Technikon Pretoria, current Tshwane University of Technology, the discipline became prominent with Afrikaans as the medium of instruction. The curriculum from Technikon Pretoria was adopted with a few changes. The book *Inleiding tot die Publieke Administrasie* (Introduction to Public Administration) by JJN. Cloete (1980), who is regarded as a co-founder of Public Administration in South Africa, was prescribed, together with articles published by the Institute for Public Administration and the South African Journal of Public Administration. The same approach was used with the establishment of the University component. A three-year Bachelor of Administration in Public Administration (B.Admin) was introduced. The UNISA curriculum was adopted with a few changes, and UNISA acted as moderator of the examinations, which were assessed locally. The material used was based on study guides compiled by the Department of Public Administration at UNISA. The course content was taught locally by newly appointed Namibian and foreign lecturers. The curriculum used by both the Technikon and University component of the Academy was mainly based on South African examples, and lacked local examples. Moreover, an inadequate supply of literature suitable for Namibian students caused some challenges.

The teaching and training of students in the discipline of Public Administration and Management were limited to undergraduate studies. Furthermore, as Namibia was on its way to becoming an independent state and nation, the curriculum did not prepare the students for the challenging tasks that they would face in an independent Namibian Public Service. Therefore, an urgent need for more relevant, appropriate and effective capacity building for service delivery in Namibia became essential. The

curriculum became irrelevant and outdated for a developing state such as Namibia. Moreover, this curriculum approach focused on the technical aspects of curriculum development and did not encourage the inclusive approach to curriculum design. The academic staff at both the Technikon and University components consisted mainly of white males, and lacked representation from Namibians in disadvantage communities. There was thus an urgent need to re-think the needs and expectation of an independent Namibia, and to design a more inclusive curriculum. This approach implies that the curriculum meets the needs of society and the employer; the following factors need to be taken into consideration when designing the new curriculum;

- Political, economic, legal and technological changes in cultures and societies;
- Priorities and concerns of societies at particular times; and
- Social and cultural preoccupations of students been taught.

Within the Namibian environment the Ministry of Education requires that higher education institutions in Namibia adhere to certain international criteria and standards. In this regard the Namibia Qualification Authority (NQA) and the NCHE has been established to ensure that quality education is promoted by institutions of higher learning. The policies developed by both UNAM and the PoN are to enhance the development of inclusive curricula by academics for their respective institutions. This approach implies developing a curriculum based upon the needs, social realities, interests, concerns and aspirations of the community, employer, international partners and the institution at large. Furthermore, students have the option of enrolling for their qualification in Public Administration and Management, either at the PoN and UNAM on the fulltime, part time or distance education mode. This flexible approach allows students in the regional centers and towns to further their studies. Both UNAM and the PoN have established regional centers throughout the country to assist students with their studies. Not only do the centers provide students with administrative and library assistance, but they also provide academic assistance through tutorial classes at these centers. The centers are also equipped with computer equipment and internet facilities to assist students in compiling their assignments. Completed assignments can be submitted through electronic mail to the main center in Windhoek. The content of the distance education study materials developed is the same as for full and part time students, and is developed in a student centered and student friendly manner. Students can also make use of the electronic platform to access course materials, course outlines and power point presentations uploaded by the full-time lecturers.

Conclusion

The teaching and training of students and practitioners in the discipline Public Administration and Management in Namibia has gone through various stages of development and growth. The movement away from a colonised environment to a Namibianised environment has created many demands and challenges. However, this newly founded inclusive approach created a process which allows for all stakeholders to get involved and develop a curriculum for Public Administration and Management training and teaching at various levels to address the demands of the Namibian Public Sector. Not only was it a steep learning curve for all participants involved, but it was also the fulfillment of a vision to become independent in thinking and

thought. The future of Namibia and its future endeavors in developing curricula, programmes or courses for Public Administration and Management is now truly in the hands of Namibians.

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Effect of Cognitive Learning Style on Mathematics Achievement

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Abstract: The present study was designed to explore the influence of cognitive learning styles on levels of mathematics achievement. The participants in this study were 176 secondary school students in Islamabad, Pakistan. The frequencies of the participants in the two learning style categories are the following: Convergent (n = 99) and Divergent (n = 76). The instruments used in the study were the Convergent and Divergent Test, the Annual Gazette 2010 of the Federal Board of Intermediate and Secondary Education Islamabad, and a Demographic form. The major finding of the study is that learning styles were highly associated with student mathematics achievement.

Keywords: Academic achievement; Mathematics achievement; Convergent learning style; Divergent learning style.

Introduction

Students can differ in the ways in which they process information and approach learning tasks. Such different ways in learning may be termed cognitive learning styles (e.g., Bahar&Hansell, 2000; Hayes &Allinson, 1998; Jonassen& Sternberg, 1993; Zhang & Sternberg, 2006).

Some research studies have attested to the influence of cognitive learning style on student academic achievement. For instance, Matthews (1996) demonstrated that adjusting instruction to the cognitive learning styles of students can enhance student academic achievement. Reynolds and Gerstein (1992) found that teachers and administrators improve the quality of instruction in their schools when they are aware of their own learning styles and the learning styles of their students.

Hudson (1966) introduced two categories of cognitive learning styles: (a) convergent and (b) divergent. A person with a convergent learning style, termed a Converger, tends to do well with tasks with singular conventionally accepted solutions. A person with a divergent learning style, termed a Diverger, tends to be able to respond well with tasks that permit multiple equally acceptable solutions. The convergent learning style is better oriented toward the completion of intelligence tests; whereas, the divergent learning style is better oriented toward the completion of open-ended cognitive tests. Danili& Reid (2006) found that Convergers tend to score highly in problems requiring single conventionally accepted solutions clearly obtainable from the information available (as in intelligence tests), but at the same time tend to obtain low scores in problems requiring the generation of several equally acceptable solution.

According to Kolb (1999), the convergent learning style depends mainly on the dominant learning capacities of active experimentation and abstract conceptualization. Convergers take abstract ideas and actively experiment to find practical uses for the information by finding solutions to the problems. They perceive abstractly

and process actively. This style has great advantages in decision-making, problem solving, traditional intelligent tests, and practical applications of theories. Therefore, persons with this style are often superior in technical tasks and problems and inferior in social and interpersonal matters. They tend to choose to specialize in the physical sciences and technical fields.

On the other hand, divergent thinking deals with the capacity to generate responses, to invent new ones, to explore and expand ideas (Danili& Reid, 2006). It is flexible thinking that leads toward the generation of many possible solutions with some possibly being novel and unexpected.

Divergent thinking has four attributes: (a) fluency, the capacity to produce rapidly a multitude of ideas to a problem; (b) flexibility, the capacity to consider a variety of approaches to a problem simultaneously; and (c) originality, the tendency to produce ideas different from others; and (d) elaboration, the capacity to think through the details of ideas and carry it out (Giachetti, 2010; Sarsani ,2006).

In the opinion of Kolb (1999), the divergent learning style depends mainly on concrete experience and reflective observation. Divergers perceive concretely and process reflectively. The divergent learning style contributes to imaginative abilities and the awareness of meaning and values. Therefore, persons with this style tend to organize concrete situations from different perspectives and to structure their relationships into a meaningful whole; they focus on adaptation by observation instead of by action; they like to use their imagination when solving problems; they are superior in generating alternative hypothesis and ideas, and tend to be people- or feeling-oriented; they tend to choose to specialize in liberal arts and humanities.

Therefore, Convergent and divergent thinking styles are two different ways of problem solving. Students have strong preference for one style over the other. Both styles can also work together (Griffey, 2011). The conceptual differentiation of convergent vs. divergent thinking does not correspond to two contradictory opposites. They are not mutually exclusive, but they are rather complementary and for science education mixed types are required. For example, in a complex problem-solving process, primarily, divergent abilities are necessary and later on in the process; convergent thinking is required for decision making and conclusion (Heller, 2007).

Research studies have also revealed the areas of better performance for convergent and divergent learning styles. Zamman (2006) in his study with Pakistani students of class 8th found that both boys and girls divergent in their thinking style perform better in science subjects. In his research, Johnstone and Al-Naeme (1995) used mini-projects (problem solving at the bench) as a vehicle to motivate the curious pupils. The evidence indicates that those who do best in practical problem solving of the mini-project type are divergent pupils. Danili and Reid (2006) conducted a study in Greece including 12 public upper secondary schools with the pupils of Grade 10 (Age 15-16) and found that the divergent pupils outperformed convergent pupils in the subject of chemistry. Cagiltay (2008) studied the relationship between student learning styles and their performance in engineering education programs with a sample of 285 students. Results revealed that convergers performed better than the divergers.

Tsitsipis, Stamovlasis, and Papageorgiou (2010) found that divergent pupils performed better convergent pupils in understanding the particulate nature of matter

and its physical changes. Bahar and Hansell (2000) determined that the cognitive dimensions of field dependence/field independence and convergent/divergent learning style are fairly independent factors, but, if anything, divergent subjects tended to be field independent and convergent subjects tend to be field dependent. Also, convergent students tend to have lower working memory capacities than divergent students. In Word Association Tests and grid questions, Divergers scores higher than Convergents. Similar results could be inferred from the study of Tinajero and Paramo (1998).

Despite being an important learning style, Convergence-Divergence cognitive style has not received much attention (Danili&Reid, 2006). Therefore, this research study was implemented to shed light on the influence of convergent and divergent learning styles on levels of mathematics achievement among students at the secondary school level.

Methods

Participants

The participants in this study were 79 boys and 97 girls from two randomly selected secondary schools in Islamabad.

Instruments

1. Annual Gazette 2010. Annual Gazette 2010 of Federal Board of Intermediate and Secondary Education Islamabad provided the scores of the students on their recent annual examinations in mathematics.

2. The Convergent and Divergent Test. The Convergent and Divergent Test was developed at Centre for Science Education, University of Glasgow. Bahar and Hansell (2000), Danili and Reid (2006), and Zamman (2006) made use of this test in their respective research studies. The test used here consisted of six mini-tests. The pupils were allowed to write as many answers as possible for every question that is given. The time allocated was 20 minutes. One mark is given for every single correct response and the highest possible score that could be gathered in these tests is 130. This test had the following component subtests:

(1) Test 1. This test was designed in order to determine the pupil's ability to think of as many words as possible having the same or similar meaning to the one that is given. Moreover, an example is provided at the beginning of the test to clarify what the pupil is required to do. The time limit that has been set for this test is four minutes.

(2) Test 2. The pupils were asked in this test to write as many sentences as possible consisting of four given specific words in each sentence. These given words should be used in any constructive sentence in the same order in which they were written in the test. Again, an example is provided at the beginning of the test, and four minutes were set as the time for this test.

(3) Test 3. Most convergent/divergent tests are verbal. It is prudent to mention that verbal tests could prove arduous for some pupils, especially those who have difficulty in language or writing; therefore, this pictorial test may be considered as an opportunity for such pupils to express easily their own ideas and imaginations. Hence in test -3, pupils were required to draw up to five symbols for each word or phrase given. Five minutes was the time limit for this test and one example was also provided to illustrate the test.

(4) Test 4. This test is intended to permit pupils to reflect on their thinking about a given subject. The pupils were asked to write all the things “which were round or which are round more often than any other shape”. The time limit is two minutes, and the pupils are given an example at the beginning of the test to illustrate what is required from them.

(5) Test 5. This test is similar to test 4. The pupils were required to think about various words, which begin with the letter ‘G’ and end at the letter ‘T’. Names of people or places are not allowed. An example is given for this test, for practice. Two minutes were allowed for the completion of this test.

(6) Test 6. It is a free-imagination test. Pupils were given a specific topic and asked to write as many ideas as they can about such a topic without any restrictions. This test may make demands upon the pupil’s ability in composition and imagination. An example is provided at the beginning of the test, and three minutes were given as the time limit.

The test was not translated into Urdu, because the English language is the medium of instruction.

Procedure

The Convergent and Divergent Test was administered to all of the participants in the study. They were then placed into two groups: (a) convergent; and (b) divergent. The participants placed in the divergent group had higher scores than the participants placed in the convergent group.

Among the boys, there were 61 in the convergent learning style group and 18 in the divergent learning style group. Among the girls, there were 38 in the convergent learning style group and 59 in the divergent learning style group.

The Annual Gazette 2010 provided the scores registered by the students in Mathematics in their annual examinations conducted by the Federal Board of Intermediate and Education Islamabad.

Results

Descriptive statistics

Table 1 provides the means and standard deviations for the participants on the mathematics examination.

Table 1: *Descriptive Statistics for the Participants on the Mathematics Examination*

Participants	Group	N	M	SD
Boys	Convergent	61	46.51	13.592
	Divergent	18	53.94	17.165
Girls	Convergent	38	58.87	12.364
	Divergent	59	58.24	11.732
Total	Convergent	99	51.25	14.399
	Divergent	77	57.23	13.202

As indicated in Table 1, the boys in the Divergent group recorded higher mean scores than boys in the Convergent group, but the girls in the two groups recorded similar mean scores.

Inferential statistics

The comparison of group means resulted in the following results: (a) the Divergent group mean was significantly greater than the Convergent group mean ($t = 2.834$, $df = 174$, $p < .01$); (b) the mean of the Divergent boys was significantly greater than the mean of the Convergent boys ($t = 1.918$, $df = 77$, $p < .05$); and (c) the mean of the Convergent girls was significantly greater than the mean of the Convergent boys ($t = 4.553$, $df = 97$, $p < .01$).

A two-way analysis of variance was performed with the two independent variables being gender and learning style and the dependent variable being the mathematics score. The only significant effect was the main effect for gender ($F = 13.924$, $df = 1$, $p < .001$) with the mean for the girls (58.553) being significantly greater than the mean for the boys (50.226). The R^2 for this two-factor model was only .153 with an adjusted R^2 being .138.

Discussion

Table 1 provided evidence that the participants have different cognitive learning styles. Most of the boys (61.6%) had convergent learning styles; whereas, most of the girls (76.6%) had divergent learning styles. These results support the view that individuals can have characteristic ways of learning (Zhang & Sternberg, 2006).

The comparison of group means indicated that individuals with divergent cognitive learning styles had significantly higher mathematics scores than participants with convergent cognitive learning styles. In addition, boys with divergent cognitive learning styles had significantly higher mathematics scores than boys with convergent cognitive learning styles. These results are compatible with the findings of earlier studies (e.g., Tsitsipis, Stamovlasis, & Papageorgiou, 2010; Zamman, 2006; Danili & Reid, 2006; Bahar & Hansell, 2000; and Johnstone & Al-Naeme, 1995).

In all of those studies, divergent individuals performed better than convergent individuals. Tsitsipis, Stamovlasis, and Papageorgiou (2010), Danili and Reid (2006), and Bahar and Hansell (2000) assumed that divergent individuals performed better, because of their stronger linguistic skills and because of an assessment format requiring linguistic skill.

The same holds for this study. A look at the format of Mathematics Question Paper shows that it has three sections. Section A is the objective part of the test consisting of multiple-choice items. Students are required to select the correct answer from the given four choices. Section B and Section C are subjective parts of the paper. In Section B, students are required to solve short algebraic questions. On the other hand, Section C consists of long geometrical theorems. Linguistic skill is required to complete Section B and Section C. Thus divergent individuals might perform better, because they have stronger linguistic skills.

Regarding individuals with convergent learning styles, girls had, on the average, higher mathematics examination scores than boys. This may be due to the possibility that girls with convergent learning styles tend to outperform boys with similar learning styles, because the girls tend to have superior linguistic skills that, in turn, support the capacity to solve mathematics problems with singular best answers. This finding is compatible with similar findings of Danili and Reid (2006) and Snyder (2000). Danili and Reid (2006) found that Convergents perform better at problems where one conventional solution is required for each problem and Snyder (2000)

determined that girls tend to have superior linguistic skills that facilitate performance on mathematics problems with singular best answers.

This study revealed that students have different learning styles, convergent and divergent. Divergent students outperformed the convergent students and girls performed better than boys. These results have strong implications for teachers as well as researchers. One implication is that teachers should consider the learning styles of students when deciding on their teaching strategies and assessment methods to provide different teaching strategies and assessment methods for students with different cognitive learning styles.

One limitation of the study was that the researchers had access only to the total score of each student on the mathematics examination. Future research could replicate this study but with scores on mathematics tests that entail either multiple choice questions, or short supply items, or geometrical proofs. The findings of this study may change with different assessment methods being used to assess mathematics achievement.

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Teachers' Perceptions, Statistical Knowledge and use of Modeling for Teaching Statistics

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Abstract: This study was intended to access teachers' perceptions and statistical knowledge for teaching using modeling in governmental secondary schools of Addis Ababa Gulele Sub-City. The research method used for study was descriptive survey supported by qualitatively. The respondents of the study were all grade nine mathematics teachers in Addis Ababa Gulele sub-city. Questionnaire and interview were the instruments employed for data collection. The findings were: most respondents have positive perceptions for teaching statistics topics; minority of teachers haven't necessary statistical knowledge for teaching statistical topics; and teachers didn't use modeling when they teach those topics because of different challenges like; teachers' knowledge, time, motivation, facilities, and students' background knowledge. The recommendation were: teachers need to be equipped with the necessary statistical knowledge; and concerned bodies should give continuous professional development, workshop or training concerning teaching statistics and using modeling for mathematics teacher.

Keywords: Teachers' perceptions; Statistical knowledge; Modeling; Teaching statistics

Introduction

The importance of statistics education especially in secondary school has been emphasized in numerous mathematics curriculum reforms carried out recently in many countries (González, 2011), it being noticeable that variability may arise within all the statistical contents included in such curricula. Hence, the role played by the statistical knowledge for teaching, perceptions on teaching and learning of variability-related concepts, and conceptions of variability held by teachers is crucial to achieve satisfactorily the mathematics curriculum.

Aiming towards ensuring statistical literacy for all students before leaving compulsory education, recent curricular reforms in many countries have brought a number of statistical topics into the mathematics curriculum (e.g., NCTM, 2000), especially in secondary school, in which fundamental ideas in statistics such as data, distribution, representation, association, probability, sampling and inference are being taught. Hence the importance of the role played by teachers in teaching such fundamental ideas, which may be either the only statistics program taken by future users of statistics, or the knowledge base for those continuing studies at tertiary level. Thus, teachers' subject matter and pedagogical content knowledge in relation to variability-related contents, their perceptions on teaching and learning of such contents, and their conceptions of variability are anticipated to affect the performance and quality of teachers' work, and hence their students' learning (González, 2011).

If teachers are to influence their students' learning outcomes, Shulman (1987) has argued that effective teachers require: content knowledge; general pedagogical knowledge; curriculum knowledge; pedagogical content knowledge; knowledge of learners and their characteristics; knowledge of education contexts; and finally

knowledge of educational ends, purposes, and values. Given this, teachers' own attitudes, knowledge, and perceptions associated with statistical literacy should have a direct and indirect influence on their students' learning and educational outcomes in this domain (Hay, 2010).

Statistical modeling

Teaching statistics using modeling has been enjoyable for both teachers and students. It is fortunate that students find the experience enjoyable and engaging, as our expectations of the quality of their work have increased. Moreover, it is fortunate that the teachers have found the experience to be enjoyable as the preparation time, particularly during the transition away from a more traditional lecture-based format, was considerable (Samsa, Thomas & Lee, 2012). In addition to this, statistical modeling is a process of asking questions of data based on your knowledge of the system represented by the data. Teaching statistics through modeling provides students with the concepts and techniques they need to understand contemporary research and statistical discourse.

Problem solving using modeling tasks must enable students to continually question their representations towards refining them in the direction of attaining a workable solution model for a specific purpose. It must be noted however that designing good modeling activity is one part of the problem. Knowing how to properly execute problem solving activity using modeling has to be considered for learning to be maximized. It includes basic and important skills that may be used in understanding statistical information or research results. These skills comprise being able to organize data, construct and display tables, and work with different representations of data. Thus, it is teachers' ability to read and interpret summary statistics in the everyday media: in graphs, tables, statements, surveys and studies (Gal, 2000).

Recent teaching studies have led to teaching based on modeling using simulations of models in connecting statistics to simulated real phenomena, fostering the growth of basic statistics concepts. Such a choice will necessarily bring with it new challenges in how children learn and gives rise to research questions about the conceptual development of students who are engaged in connecting probability to statistics and to simulated real phenomena (Pratt, 2011, p. 3).

In general, the modeling approach worked well with the majority of reasonably and well skilled teachers. But many of the teachers with weaker statistical skills took considerably longer to master the contexts and skills developed in the activities described above. This suggests that a teacher's level of statistical skill is an important determinant of success in teaching using modeling (Brown & Schafer, 2006).

Teachers' perceptions of statistics

Many researchers said that there is considerable evidence to indicate that teacher perceptions about statistics influence their teaching of mathematics (Hart, 2002). As a result, many teacher education programs, aligned with the philosophy of current mathematics education reform efforts, are beginning to also focus on improving teacher perceptions and knowledge in mathematics methods courses to address such preconceived ideas (Nespor, 1987).

Findings indicates that similar to teachers in higher education, many mathematics and statistics teachers in elementary or secondary education feel uncomfortable teaching statistics concepts because they have not been adequately trained (Franklin, 2000). Furthermore, some research suggests that many of these teachers have either never taken a formal statistics course or have had very little formal training (Begg& Edwards, 1999: Franklin, 2000). Only a few other studies have considered elementary and secondary teachers' experiences with statistics teaching and learning, with less than optimistic results. Other important findings revealed that teachers who had never taken a statistics course reported less positive perception towards statistics than teachers who had taken at least one course. Teachers in their study reported that they felt reasonably confident about teaching statistics at their class level, although their attitudes about statistics were negative and their understanding of concepts was limited and weakly developed (Begg & Edwards, 1999).

The problematic aspects of the teaching of statistics being reported give much to think about the teachers' perceptions of the teaching of statistics and also of mathematics. Descriptive statistics does not seem to be a problem, since the mathematical tools are simple; inference is considered more interesting, but difficult to learn, as there are many not easy mathematical concepts in it. Mathematics dominates statistics not only because it is generally taught as part of mathematics, but also because of the mathematical background of the majority of teachers. Reflecting this, one major problem for the teaching of statistics was reported to be the lack of time. The teachers with no statistical background, "forced" to teach statistics by the school syllabus, did not go very far in their self-preparation, as they attained it directly from school textbooks (Gattuso &Pannone, 2002).

Teachers' knowledge of statistics

According to Groth (2007) statistical knowledge for teaching conceptualize as knowledge of mathematical and non mathematical which would be activated for statistical activities. The mathematical and non mathematical encompasses the common and specialized knowledge, which needs to be activated for many pedagogical activities. The common knowledge that enables one to read statistical graphs accurately, understand common statistical terms, read and make sense of statistics in the medias, informal statistical inference skills and specialized knowledge that helps one to get deep and well connected knowledge of introductory statistics material-descriptive and inferential and consumer and producer of statistics-design experiments, collect data and analyze data, and draw conclusion.

Teachers may benefit from specialized mathematics knowledge of how students decode such data displays. For example, box plots pose difficulty for many students because they hide data values, whereas displays like dot plots and stem-and-leaf plots show individual data values (Zawojeski & Shaughnessy, 2000). Statistical-question formulation also requires some knowledge that is primarily non mathematical. An important aspect of common statistical knowledge is to understand that statistical questions anticipate answer based on data that vary (Frankin et al, 2007). In mathematical community, it is ordinary practice to pose a question with the interest of producing a proof that contains a decisive answer to a question. In the statistical community, however, it is ordinary practice to pose a question and then gather evidence to form conditional conclusions. This difference between statistical and mathematical questions can elude teachers, as they may expect deterministic answer to questions that are stochastic in nature (Groth & Bergner, 2007).

What is the statistical knowledge necessary for teaching? Shulman (1987) have argued that a special type of knowledge is needed to teach mathematics, that this knowledge is different than just more mathematical content, and that it is more than just what called pedagogical content knowledge. For example, a special knowledge is needed for teaching algebra that involves knowing the types of symbolic mistakes and misconceptions that students will have, and how to address them. A special knowledge is needed for geometry that involves the role of examples and counterexamples, and reasoning with proof. Within each content area of mathematics there are special types of knowledge that are critical to effective teaching of that content.

Statement of the problem

In Ethiopia, mathematics is taught as a subject starting from grade one up to university level. In recent years, there have been an expansion and renewal of the statistics content in the mathematics curricula in Ethiopia through all school grade levels from primary to secondary levels. However, no similar attention has been paid to the preparation of mathematics teacher to teach statistics at these levels. Teachers need opportunities to create statistical activities and investigations themselves and to try them out while supported in their classroom by a statistics educator. The teaming of teachers with researchers in the classroom may help to facilitate teachers' abilities to transfer their own insights in statistics to experiences for their students. There is also appears to be a plentiful source of research regarding elementary and secondary teachers' mathematics teaching experiences yet not much is known about the teachers at this level teaching statistics. One finding indicates that similar to teachers in higher education, many mathematics teachers in secondary education feel uncomfortable teaching statistics concepts because they have not been adequately trained (Franklin, 2000). Furthermore, previous research suggests that many of teachers have either never taken a formal statistics course or have had very little formal training (Franklin, 2000). There is little research into teachers' perceptions and knowledge of statistics. This is another area of research that is wide open for statistics education. But, very little work has been done on teachers' knowledge and perception specifically about statistics (Shaughnessy, 2007).

Research questions

The purpose of this study was to investigate teachers' perception and statistical knowledge for teaching using modeling on secondary school statistics education. The research questions related to this purpose were: What are the perceptions of mathematics teachers' in teaching statistics? Do mathematics teachers have the statistical knowledge to teach statistics? To what extent do mathematics teachers use modeling, if any, to teach descriptive statistics? What are the opportunities and challenges faced by mathematics teachers while using or to use modeling in teaching statistics?

Methods

Research design

This study had an aim of assessing mathematics teachers' perceptions, statistical knowledge and use of modeling for teaching statistics. This study was employed descriptive survey method. It also helps to investigate the current situation, pointed

out the major problems and comes up with solutions. In addition, it gives a chance to produce relatively highly reliable result.

Research sites, sampling and participants

The research sites were all secondary schools in Gulele sub-city, which were, EntotoAmba, Mieraf, Dil-Ber, and KecheneDebreselamsecondary schools. All theschools were found to the northern part of Addis Ababa city. The participants of the study were all grade 9 mathematics teachers from four governmental secondary schools in Addis Ababa Gulele sub-city selected using purposive sampling. The total numbers of participants of the study were 26 (25 Male and 1Female) grade 9 mathematics teachers. Among those teachers 6 teachers were selected for interview by simple random sampling (Lottery method).

Instruments

The researchers were collected quantitative and qualitative data from each of selected schools after all grade nine mathematics teachers complete the descriptive statistics topics. The researchers used questionnaire and interview to gather data on the mathematics teachers' perceptions, statistical knowledge and use of modeling for teaching statistics.

Questionnaire

Firstly to collect the necessary data for the study, questionnaires were designed by using Likert scale that contain five options which were; strongly disagree, disagree, undecided, agree and strongly agree. The questionnaire was used to get quantitative information concerning the following: teachers' perceptions towards teaching statistics; their statistical knowledge for teaching; opportunities to use modeling and challenges, if any, for teaching statistics.

Interview

The second data gathering instrument was interview. It used to obtain qualitative information about teacher`s perceptions, statistical knowledge and use of modeling for teaching statistics. Five items were prepared for interview and six teachers were interviewed from the selected schools. To make the communication more effective, all interviews were made using respondents' vernacular language, which is Amharic. During interviews in the main study, all interviews were recorded using tape-recorder. Shortly, before using tape-recorder, the interviewees were informed about the purpose of using it. Interestingly, they all agreed without any complain.

Validity and reliability

We used different validity and reliability tests in the research. Content validity, face validity and construct validitywere used for checking the validity of the instruments. Reliability tests were used for checking the extent to which the instruments measurement the same results with different investigators or observers. A pilot test was administered for 10 respondents in New Era secondary school. The purpose of this test was to check the appropriateness of the items in the instrument and to make the necessary corrections based on the feedback obtained. Accordingly, amendments

were made for some of the items and the development of the statistical perceptions scale was found to be reliable having a coefficient alpha Cronbach of 0.87.

Data analysis

To analyze teachers' perception and knowledge of statistics the researchers were used both quantitative and qualitative analytical methods. Accordingly, percentages, frequency counts, mean (average) and standard deviation were used to analyze the statistical perceptions scale items of questionnaire. Information generated from the interviews and open ended questions were presented and described qualitatively.

Results and Discussion

Statistical methods were employed to present and analyze the structured items of the questionnaire quantitatively. To supplement and enrich the information that was drawn using a questionnaire, the data from closed and open ended questions and interview were analyzed and described qualitatively. Here the data obtained from different sources were presented and interpreted as follows.

Results of teachers' perceptions on teaching statistics

To answer the first research question, "What are the perceptions of mathematics teachers' for teaching statistics?" the researchers were presented as follows.

Table 1: Results on statistical perceptions scale

Sl. No.	Statement	Strongly Disagree		Disagree		Undecided		Agree		Strongly Agree	
		F	%	F	%	F	%	F	%	F	%
1	I have a positive perception for teaching statistics	0	0	2	7.69	2	7.69	20	76.92	2	7.69
2	For me statistics is important. Because, it help me to make sense of our world.	0	0	0	0	2	7.69	21	80.77	3	11.5
3	Statistics is not really very useful because it tells us what we already know anyway.	1	3.85	20	76.92	3	11.53	2	7.69	0	0
4	Teaching statistics is interesting, because it is useful for me in everyday my life.	0	0	2	7.69	1	3.85	21	80.77	2	7.69
5	I do not feel confidence when I teach statistical concepts.	0	0	2	7.69	1	3.85	23	88.46	0	0
6	I perceive that teaching descriptive statistics is simple for mathematics teachers	1	3.85	4	15.38	5	19.23	16	61.53	0	0
7	For me, teaching statistics is very easy because it has similar procedure as mathematics.	0	0	4	15.38	2	7.69	20	76.92	0	0
8	To teach statistics mathematics teachers must have training in statistics	0	0	4	15.38	1	3.85	14	53.85	7	26.9
9	Statistics is too math's oriented so, math's teachers can easily teach statistical topics specially descriptive statistics.	1	3.85	2	7.69	5	19.23	15	57.69	3	11.5

As can be seen from Table 1 item 1, almost all of the respondents 22(84.61%) have a positive perception for teaching statistical topics and some of them 2(7.69%) are disagree the idea. However, few of the respondents 2(7.69%) didn't show agreement or disagreement on the idea. Moreover, the result from interview revealed that all teachers have positive perceptions for teaching statistics because as they said statistics can play an important role in our and students' life. Supporting this idea, Tibebe, a teacher from one of the samples schools said,

“I have a positive perception towards statistics teaching. Although I haven't taken enough courses, I have strong interest to learn statistics course. Now, when I teach, I tried my best to give life to the course. Because I know that how statistics can plays an important role in our students' future life.

Almost all of the respondents 24(92.31%) agreed that statistics is important, because it help them to make sense of their life (item 2 Table 1). However, few of the respondents 2(7.69%) did not show either agree or disagree on the importance of statistics. On the other hand, item 3, in table 1 indicated that the majority of the respondents 21(80.77%) reported that they are disagreed with the idea; statistics is not really very useful because it tells us what we already know anyway. Few respondents 2(7.69%) agreed with the view and the rest 3(11.53%) didn't show the agreement or disagreement.

The result from Table 1, item 4, showed almost all of the respondents 23(88.46%) agreed that teaching statistics is interesting, because it is useful for them in everyday their life. But some of the respondents 2(7.69%) did not agree with this view and one of them 1(3.85%) did not show either of the two options. In addition, Albeitskreis (2003) indicated that, even though, nothing is known about what teachers really know, think and do. They generally acknowledge the practical importance of statistics even if that means other mathematical topics might receive less attention.

In the same table (Table 1), item 5, almost all of respondents 23(88.46%) respond that they did not feel confidence when they teach statistical concepts. But some of the respondents 2(7.69%) did not accept the idea, which means they feel confidence when they teach statistical concepts. However, few respondents 1(3.85%) did not show either agreement or the disagreement on the issue. In addition to this, some researchers (Franklin, 2000) indicate that similar to teachers in higher education, many mathematics and statistics teachers in elementary or secondary education feel uncomfortable teaching statistics concepts because they have not been adequately trained. Furthermore, they suggests that many of these teachers have either never taken a formal statistics course or have had very little formal training (Begg & Edwards, 1999; Franklin, 2000).

Majority of the respondents 14(61.54%) in item 6(Table 1), perceived that teaching descriptive statistics is simple for mathematics teachers but some of the teachers 5(19.23) were disagreed. Whereas, some respondents 5(19.23%) did not show agree or disagree. In line with this, Gattuso&Pannone (2002) said that, descriptive statistics does not seem to be a problem for mathematics teachers, since the mathematical tools are simple, and more interesting.

In line with this, as we can see in table 1 of item 7, most of the respondents 20(76.92%) reported that, teaching statistics is very easy because it has similar procedure as mathematics. Regardless this some of them 4(15.38%) did not agree with the issue and few respondents 2(7.69%). despite this perceptions, finding from

interview indicated that the some of the respondents, considered as teaching statistics is very easy because it has similar procedure as teaching mathematics. For instance, one of the interviewee Hailu suggested that:

“Teaching statistics topics is a little bit different (almost the same) from mathematics topics because in statistics you can’t teach the topics without using data. In relation to this, statistics and mathematics have relations. For example, like mathematics, in statistics you can ask variant ‘x’ by giving the mean or median. Therefore, in this respect they have relations.”

On the other way, almost all of the respondents from interview stated that, teaching statistics is not similar as teaching mathematics. However they added, when we teach statistics we should use real life evidenced examples and the solution may not only one to a given question. But in teaching mathematics the examples those we use might be assumptions and their answer to a given question must be unique. Supporting this idea, Tibebe, a teacher from one of the sample schools said,

“I believe that teaching statistics is differing to that of teaching mathematics. Because when we teach mathematics by using any variable randomly and we can get the result. This is not the case in teaching statistics in statistics real data have been using.”

This implies respondents reacted differently from the same item which reads: ‘For me, teaching statistics is very easy because it has similar procedure as mathematics’. Clearly, the result showed that teachers do have a wrong conceptualization of teaching statistics. From this we can see that mathematic teachers teach statistics topics as mathematics topics.

In related to this, the responses collected from item 9, indicated majority of respondents 18(69.23%) viewed statistics is too math’s oriented so, math’s teachers can easily teach statistical topics specially descriptive statistics. while the small number of the respondents 3(11.53%) believed that statistics is not too math’s oriented and teachers may not teach easily. However, few of them 5(19.23%) neither agree nor disagree on it. However, from the literature review, Cobb and Moore (2007) explained that, Statistics should be taught as statistics because it has its own approach. Statisticians are convinced that statistics, while a mathematical science, is not a subfield of mathematics. Like economics and physics, statistics makes heavy and essential use of mathematics, yet has its own territory to explore and its own core concepts to guide the exploration. Findings from the interview almost all of the teachers agreed that statistics is not mathematics oriented it has its own territory. In supporting this, Solomon, one of the interviewees from selected schools said:

“I feel that teaching statistics is not math’s oriented. Because teaching statistics is a procedural process, when we teach statistics we collect data, organize data, present data... up to conclusion. Thus statistics is not math’s oriented it has its own territory.”

The result of item 8 in table 1 showed that, almost all of the respondents 21(80.77%) agreed that to teach statistics, mathematics teachers must have training in statistics. However, some of them 4(15.38%) disagreed the issue and few of them 1(3.85%) didn’t show the agreement or disagreement of the idea. To support the idea of item 8, Royal statistical society (2007) viewed that, Mathematics teachers require specific training and support to teach statistics. This applies both to initial teacher training and to continuing professional development. And it is important to build on existing good practice. In addition to this, Begg& Edwards (1999) reported that, mathematics teachers’ need additional preparation and training in statistics to teach the topics more effectively.

Below is the overall respondents’ perceptions for teaching statistics. Since the data of the response are approximately normal which is checked by scattered diagram, therefore, the researcher used average such as: negative perceptions in teaching statistics (1.0 - 2.5); average perceptions in teaching statistics (2.6 - 3.5); and positive perceptions in teaching statistics (3.6 – 5.0)

Table 2 : *Mean of respondents’ perceptions in teaching statistics*

Items	N	Mean	SD
Respondents' Perceptions in Teaching Statistics	26	3.75	1.32

Generally, the above Table 2 revealed that the average (mean) of the respondents’ perception is 3.75 (SD=1.32) lie between averages 3.6 and 5 which is positive perception in teaching statistics. Therefore, we conclude that most respondents have positive perceptions for teaching statistics. In line with this, Begg& Edwards (1999) said that, although most of the teachers have overall positive view about their statistics topics, many are undecided about their experiences. In addition to this, González (2011) mentioned that, perceptions on teaching and learning of statistical concepts, and conceptions of variability held by teachers is crucial. Their perceptions on teaching and learning of such topics are anticipated to affect the performance and quality of teachers’ work, and hence their students’ learning.

Results of teachers’ statistical knowledge for teaching statistics

In this section the results collected from perception scale, interview, and open ended and closed ended questions on teachers’ statistical knowledge for teaching statistics were presented as follows.

Table 3: *Teachers’ statistical knowledge for teaching*

No	Statement	Strongly Disagree		Undecided		Agree		Strongly Agree			
		F	%	F	%	F	%	F	%		
1	I feel that statistics should be required specialized knowledge for teaching.	1	3.85	0	0	2	7.69	17	65.38	6	23.07
2	Teachers must have good knowledge of statistics for teaching descriptive statistics.	1	3.85	2	7.69	1	3.85	19	73.08	3	11.53
3	I feel that, mathematical knowledge is sufficient for teaching statistics.	4	15.38	9	34.62	1	3.85	12	46.15	0	0
4	Mathematics teachers need statistical knowledge to teach descriptive statistics.	1	3.85	3	11.53	0	0	18	69.23	4	15.38
5	I feel that statistics should be required specialized knowledge for teaching.	1	3.85	0	0	2	7.69	16	61.54	7	26.92

Item 1 of Table 3 revealed that, most of the respondents 23(88.26%) they feel that statistics should be required specialized knowledge for teaching. Yet, some of the respondents 2(7.69%) did not show agreement or disagreement on it and one of them (3.85%) was strongly disagreed. The result from the interview stated that

almost all the interviewees agreed that specialized knowledge is important to teach statistics effectively. Supplementing this Zelalem, one of the interviewee from the selected schools suggested that:

“In order to teach statistics, I believe that specialized knowledge is needed because statistics topics need different concepts. Mathematics also need knowledge but it is not like statistics because in statistics you might go till conclusion and recommendation. As result, statistics need specialized knowledge.”

Moreover, Yilmaz (1996) viewed that, to make teaching more effective, teachers need to deepen their understanding how students learn statistics, i.e., what are students' cognitive and non-cognitive prerequisites or obstacles respectively in learning and what is the impact of these factors on their learning processes.

As the result for (item 2, Table 3) depicted, most of the respondents 22(84.61%) reported that teachers must have good knowledge of statistics for teaching descriptive statistics and however, some of the respondents 3(11.53%) disagreed on the idea and few 1(3.85%) didn't show the agreement or disagreement on the issue. For instance, Balkew, one of the interviewee stated that:

“I strongly believe that good statistical knowledge is essential to teach statistical courses (topics) and it needs real data. So that, for mathematics teachers relatively better statistical knowledge is important for teaching statistical topics. All in all, when a teacher teaches statistical topics, he should have good knowledge of statistics in order to equip the students better.”

As well as, item 4, on the same table (Table 3), most of the respondents 22(84.61%) reported that Mathematics teachers need statistical knowledge to teach descriptive statistics. And few of them 4(15.38%) did not agreed on the idea. Supporting this idea Groth (2007) strengthened that, the knowledge needed to teach statistics is likely to differ from knowledge needed to teach mathematics. Doing statistics involves many primarily non mathematical activities, such as building meaning for data by examining the context and choosing appropriate study designs to answer questions of interests. Although there are differences between mathematics and statistics, the two disciplines do share common ground in that statistics utilizes mathematics. Since statistics changes numbers into information and each numbers represents data, Teachers should know that data are generated with respect to particular contexts or situations and can be used to answer questions about the context or situation.

Additionally, item 3 revealed that, majority of the respondents 13(50%) they did not felt that, mathematical knowledge is sufficient for teaching statistics. Nevertheless, some of the respondents 12(46.15%) agreed and few of these respondents 1(3.85%) did not show either agreement or disagreement on the idea.

Eventually, in item 5 of Table 3, almost all of the respondents 23(88.46%) said that, Statistics requires a different kind of thinking, because data are not just numbers, they are numbers with a context. However, few of the respondents 2(7.69%) showed disagreement on the idea and few of them 1(3.85%) did not either agree or disagree on the issue. To overcome this, Chance (2002) stated that, statistical thinking involves an understanding of why and how statistical investigations are conducted and the “big ideas” that underlie statistical investigations. It engages an understanding how we make inferences from samples to populations.

Below are analyzed the overall respondents' statistical knowledge for teaching statistics by considering the following descriptions: below average statistical knowledge (1.0 – 2.5); average statistical knowledge (2.6 - 3.5) and above average statistical knowledge (3.6 – 5.0)

Table 4: *Statistical knowledge for teaching statistics*

	N	Mean	SD
Respondents' statistical knowledge for teaching statistics.	26	3.51	1.01

As can be seen from Table 4, the mean of the respondents' statistical knowledge for teaching statistics is 3.51 (with SD=1.01). Then it belongs almost to 2.6 – 3.5 which is average statistical knowledge. Therefore, we conclude that respondents have average statistical knowledge for teaching statistics. Along this line, Hill, alt. (2005) noted that, the most knowledgeable teachers deliver highly effective statistics instruction; alternatively, the least knowledgeable teachers have any effect on students' statistics achievement.

Thus we can generalize that, to teach statistics respondents must have good or specialized statistical knowledge rather than common statistical knowledge. And also Mathematical knowledge is not sufficient to teach statistics because statistics has its own procedural approach that means from data collection to summarization and conclusion.

Table 5: *Teachers' correction on students answers*

No	Items	Student	Valid		Invalid	
			F	%	F	%
1	Which measure of center is appropriate to summarize the given data	A	20	77	6	23
		B	14	53.8	12	46.2
		C	16	61.5	10	38.5
2	Does the mean of this data affect the value of standard deviation	A	20	77	6	23
		B	9	34.6	17	65.4
		C	7	27	19	73

Table 5 item 1 reveals that, 'which measure of center is appropriate to summarize the given data teachers' response on student A, most 20(77%) of them responds that student A is valid. Which means 'mean is appropriate' because it is the most commonly used measure of center. And few 6(23%) of them said student A is not correct. In line with this, for the open ended question 'in your own words, like explain to your students' describe what is mean?' Their responses are presented in three categories. Most of the respondents explained that mean is average or the sum of all data divided by the number of observations. The second group mentioned that mean is the average of the given numerical data and the third group described mean as let $x_1, x_2, x_3, \dots, x_n$ be given data then mean is calculated as the sum of all given data divided by n (i.e. $(x_1+x_2+x_3+\dots+x_n)/n$).

In the same way for student B, majority 14(53.8%) of teachers it is correct and some of them 12(46.2%) did not accept the idea that 'mode is appropriate', because it can be used with quantitative data. Result from the open question majority of them said that mode is the highest or most frequent occurring value among the data and minority of them explained that mode is the highest frequency.

Teachers' correction for student C, majority 16(61.5%) of teachers said that student C is correct that is 'median', because it is resistance to outliers. But some of them 10(38.5%) it is invalid. The result from open question, most of the teachers explained that median is simply the middle term and some of them explained that after arranging the data ascending or descending order it is the middle term if it is odd and the average of the two middle terms if it is even.

Therefore, for the above item (item 1) the appropriate measure to summarize the given data is median or mode. Because as we can see from the table the mean=4.6, median=2 and mode=2, thus mean is not appropriate to summarize the data it affected by outlier 22. But most of them (88.8%) agreed with mean is appropriate and it indicates that teachers have no enough knowledge of the appropriate use of measures centers to summarize the given data.

Teachers' correction on students answer 'Does the mean of this data affect the value of standard deviation' in the same (Table 5, item 2). Most of the respondents 20(77%) agreed that student A is valid and few of them 6(23%) said that student A is not, for student B majority 17(65.4%) of them said that student B is invalid and few of them 9(34.6%) agreed with student B is valid and the same is true for student C. i.e., majority 19(73%) of them said that student C is invalid and few of them 7(27%) agreed with student C is valid.

From the open questions, majority of teachers explained that standard deviation is the positive square root of variance and some of them said it is the deviation of each variable from the mean. However, few of them explained it is the spread or the scatteredness of each value from the mean.

Table 6: Teachers correction on students graph reading answers

No	Items	Student	Valid		Invalid	
			F	%	F	%
1	Students were asked to read the given graph	A	17	65.4	9	34.6
		B	11	42.3	15	57.7
		C	16	61.5	10	38.5
2	If every student's score is doubled and taken out of twenty, then would there be change of shape of the graph, measure of center and measure of spread	A	20	77	6	23
		B	10	38.5	16	61.5
		C	18	62.9	8	30.8

As can be seen from table 6 item 3, most of teachers 17(65.4%) responded that student A is correct and some 9(34.6%) of them disagreed on student A answer. But, majority 15(57.7%) of teachers said that student B was not correct and minority of them agreed with student B. At last, for student C most of teachers 16(61.5%) agreed on it and 10(38.5%) of them said student C was invalid. For teacher correction on students answer in table 6 item 4, almost all 20(77%) of the teachers responded that student A is correct and some of them 6(23%) did not accept it. But, 16(61.5%) said student B was invalid and some of them agree with student B's answer. For last student C answer, most of the respondents 18(62.9%) responded that student C was correct whereas some of them 8(30.8%) did not accept it.

Results from open ended questions

Question1: Assume you are teaching grade 9 students on how to construct a

histogram for the frequency distribution of the quiz scores of 30 students in a given class below:

Score(V):	2	3	4	5	6	7	8	9	10
No. of students (f):	2	2	3	5	7	5	3	2	1

Explain to the students (a) what is on the Y-axis? (b) What is on the X-axis? (c) What would be the probable shape of the score distribution? Explain why?

For the above question 1, all the respondents responded that (a) and (b) correctly. This means we construct x-y axis and divide both axis in equal length after that we put score (v) on x-axis and number of students (f) on y-axis, then after we change the frequency distribution table in to graph. But, for question (c) more than half of them respond correctly, they said that the probable shape of the score distribution is normal (bell shape), the reason when we observe the data from 2 to 6, the number of students increase and then decrease from 6 to 10, almost by the same number of students then the graph would be bell shaped. But, the minority of them did not identify the shape and explain the reason why. Therefore, from this item we can see that teachers have the problem of interpreting and explaining statistical graph effectively.

Question2: Suppose you teach a small section of grade 9 students. One day, you asked each of your 17 students to report the number of hours they spend each week (on average) working on their homework assignments. These are the responses given by these 17 students: 10, 6, 4, 18, 5, 1, 3, 9, 11, 13, 11, 6, 7, 15, 23, 0, 8. Explain how you are going to teach your students so that they could be able to summarize and describe these data using graph.

Most of the respondents responded that to teach their students, first they change the raw data to frequency distribution table to show the relationship between the number of students and hour they spend each week (on average). And then they teach their students by sketching frequency versus number of hours they spend from the table. But some of teachers didn't know the relation and the difference between histogram and bar graph. Finally, one of the teacher responded that, first I teach them by changing the raw data to frequency distribution table and then I order my students to convert the frequency distribution table to a histogram by constructing x-y axis and he was try to foster active learning.

Therefore, based on the above results we can conclude that the respondents didn't have adequate statistical knowledge for teaching statistics. In line with this, Shulman (1987) have argued that, a special type of knowledge is needed to teach statistics, that this knowledge is different than just more mathematical content, and that it is more than just what called pedagogical content knowledge. For example, a special knowledge is needed for teaching statistics that involves: knowing the types of symbolic mistakes and misconceptions that students will have, and how to address them; the role of examples and counterexamples, and reasoning with data. Like mathematics, within each content area of statistics there are special types of knowledge that are critical to effective teaching of that content.

Results on using modeling for teaching statistics

Under this section data are presented, analyzed and interpreted on the results of research questions; "To what extent do mathematics teachers use modeling, if

any, while they teach descriptive statistics” and “What are the opportunities and challenges faced by mathematics teachers while using or to use modeling in teaching statistics” as follow respectively.

Table 7: Respondents’ result on using modeling for teaching statistics

No	Statement	Strongly Disagree		Disagree		Undecided		Agree		Strongly Agree	
		F	%	F	%	F	%	F	%	F	%
1	Sometimes, I use modeling when I teach descriptive statistics.	1	3.85	4	15.38	1	3.85	16	61.53	4	15.38
2	Specialized statistical content knowledge is needed to teach descriptive statistics using modeling.	1	3.85	2	7.69	3	11.53	17	65.38	3	11.53
3	I dislike using modeling in teaching statistics because it requires me to do more work that demands more time.	7	26.92	9	34.61	3	11.53	6	23.07	1	3.85
4	When we teach using modeling, statistical concepts will simple, easily understandable, clear, visible and useable to real life way.	0	0	1	3.85	1	3.85	15	57.69	9	34.61
5	I faced some problems when I teach using modeling in statistics class.	0	0	5	19.23	5	19.23	14	53.85	2	7.69

Table 7, item 1 portrayed that most of the respondents 20(76.92%) respond that they sometimes use modeling when they teach descriptive statistics, the rest respondents 5(19.23%) did not use modeling in teaching statistics, and one of them (3.85%) did not respond either agree or disagree. This implies that in practice they did not teach statistical topics using modeling. And the results collected from interview revealed that almost all of the respondents didn’t use modeling. In line with this, Solomon, one of the interviewee explained as:

“I didn’t try to use different models when I thought statistics. But I tried to teach the statistics topics which are found on the mathematics text book simply by drawing graph, table, and chart on the blackboard. But on my part, I didn’t create or prepare any kinds of modeling to teach statistics.”

Additionally, Zelalem, from one of the sample schools added as:

“I did not use models when I taught these topics because the listed lessons to some extent they are clear. But even the lessons are clear and easy if we teach them using modeling, it becomes more clear and easy to the students.”

From the literature, Addona (2009) stated that, in teaching statistics mathematics teachers should have an understanding of how models are used to simulate random existing inferential tools can be used to aid an investigative process.

Moreover, as we can see in Table 7 item 2, most respondents 20(76.92%) viewed that; good statistical content knowledge is needed to teach descriptive statistics using modeling. Whereas, some respondents 3(11.53%) did not agree, and 3(11.53%) did not show agreement or disagree on the idea. In addition to this, Eric (2010) said, statistical modeling is a process of asking questions of data based on teachers' knowledge of the system represented by the data. Teaching statistics through modeling provides students with the concepts and techniques they need to understand contemporary research and statistical discourse.

Majority of the respondents 16(61.54%) disagreed the idea that, 'I dislike using modeling in teaching statistics because it requires me to do more work that demands more time' (item 3). However, some of the teachers 7(26.92%) agreed the idea, and few of them 3(11.53%) did not agree or disagree in the issue.

In addition to this, for item 4, almost all of the respondents 24(92.31%) agreed with, when they taught using modeling, statistical concepts would simple, easily understandable, clear, visible and useable to real life way. Few of these respondents 1(3.85%) didn't accept this view. However, few of them 1(3.85%) didn't show the agreement or the disagreement on it. Findings from interviewees reveals that all teachers agreed that teaching statistics using modeling, statistical concepts will simple, easy to understand, and useable to life. Supporting this, Balkew, from the selected schools said that:

"In my opinion, teaching statistics using modeling the topics or the concepts will clear, simple and useable to real life. So, if we (mathematics teachers) teach using modeling, the students also motivated to learn and they can easily understand statistical terms and concepts."

Below also analyzes the overall use of modeling in teaching statistics using the following average descriptions: below average use of modeling in teaching statistics (1.0 – 2.5); average use of modeling in teaching statistics (2.6 – 3.5); and above average use of modeling in teaching statistics (3.6 – 5.0).

Table 8: Use of modeling in teaching statistics

Item	N	Mean	SD
Respondents' use of modeling in teaching statistics	26	2.44	1.19

Use of modeling for teaching statistics (table 8) showed that the mean of the respondents' use of modeling in teaching statistics is 2.44 (with SD=1.19) which lie between 1.0 and 2.5 that is below average use of modeling. Therefore, we conclude that the respondents' use of modeling in teaching statistics is below average when they were taught statistics.

Results on opportunities and challenges

a) Opportunities

The only opportunity is that teaching statistics topics using modeling are more suitable than teaching mathematics topics. Because we can use more real life

examples and situations to teach statistics topics using modeling. To support this, Tibebu, from selected schools said that:

The opportunity to teach this textbook (grade 9 mathematics) use modeling was unit 6 that means descriptive statistics. Why I select this unit, when I compare this unit to others it was suitable to teach using modeling. Because, I can use more real life situation as an example or source of data when I teach statistics.

b) challenges faced by mathematics teachers

Item 5 in table 7 above revealed that, majority of the respondents 16(61.54%) reported that they faced some problems when they teach using modeling in statistics. However, some of them 5(19.23%) disagreed on the issue, and the rest 5(19.23%) did not show either agreement or disagreement. Results from interviewees revealed that the respondents faced some challenges when they tried to use modeling. Because of time, students' background, classroom condition and it requires them to do more work and to present the topics by using modeling. To support this, one of the interviewee, Hailu, from the selected schools explained as:

I faced some problems when I tried to teach using modeling in the classroom. To use and prepare modeling for the topics it needs deep knowledge concerning it. To teach using modeling it needs more time, materials, motivation and self intuitiveness is very important.”

Conclusions and Recommendations

Conclusion

The purpose of the study was to assess teacher's perceptions, statistical knowledge and use of modeling for teaching statistics in secondary schools. Based on the above major themes the following concluding points are made.

- 1) Most of the mathematics teachers have a positive perception for teaching statistics, felt that statistics is important, interesting, simple to teach for mathematics teachers, but they did not feel confidence when they teach statistical concepts.
- 2) Statistics should required a different kind of thinking and specialized knowledge for teaching, but most teachers didn't have adequate statistical knowledge for teaching statistics.
- 3) Most of the teachers did not use modeling when they are teaching statistics

Recommendations

Based on the above findings, the following recommendations were given so that the present problem concerning mathematics teachers' perceptions and statistics knowledge for teaching using modeling in secondary schools could be minimize.

- 1) The Education Offices and Ministry of Education should create conducive environment and give support for teachers in order to develop more positive perception towards teaching statistics.
- 2) Training should be arranged for mathematics teachers on CPD that contain statistical courses.
- 3) Mathematics teachers should be aware that statistics should be taught as

statistics. Statisticians are convinced that statistics, while a mathematical science, is not a subfield of mathematics.

- 4) Textbooks should be designed in such a way that they promote modeling.
- 5) Teachers should get awareness of how they create and use modeling and how to tackle problems that face them while using modeling in teaching/learning statistics.
- 6) Finally, further research should be conducted on the entire city including all sub-cities since it could be difficult to generalize the current finding to all of Addis Ababa.

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A Comparative Study of Organizational Climate of IASE, CTE and B.Ed. Colleges

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Abstract: One factor that might influence teacher's job performance is organizational climate. The organizational climate dimensions were measured based on principals' leadership behavior and teachers' behavior. An organizational climate is the formal system of task and reporting relationships that controls, coordinates, and motivates employees so that they cooperate to achieve an organizations' goals. As for teacher's training colleges, climate is a necessary link between organizational climate and principal-teacher attitude and behavior.

Keywords : Organizational climate, Leadership behaviour, Teacher's training colleges

Introduction

An efficient principal always better knows the power of human resources in organization. It is very important to built subordinates self confidence. If recruitment of lecturers have been carefully selected and trained, such confidence will be justified. Conger (1988) calls this process, the process of strengthening subordinates' belief in their capabilities.

One factor that might influence teacher's job performance is organizational climate. The organizational climate dimensions were measured based on principal's leadership behavior and teacher's behavior. "Principals can encourage effective performance of their teachers by identifying their needs and try to meet them" (Adeyemi, 2010). This encouragement is very much dependent on various aspects of the principal's leadership behavior. Teacher's behavior too plays a role in the teacher's job performance. Both principals' behavior and teachers' behavior are part of organizational climate which influence over all working performance.

A successful organization has one major attribute that sets it apart from unsuccessful organizations: dynamic and effective leadership. A college is an organization in which the endeavors of several components within the accomplishment of its goals. The principal is a designated leader of organization in teacher's training colleges.

As for teacher's training colleges, climate is a necessary link between organizational climate and principal-teacher attitude and behavior. It has been remarked that the formal characteristics of college have an important influence has tried to find outclimatic condition of IASE, CTE and B.Ed. colleges.

In nut shell, the principal ship is a very demanding activity and those principals who have requisite traits- drive, desire to direct, self confidence, integrity, emotional maturity, effective team work, costiveness and knowledge of administrative skills in profession etc. have considerable advantage over those who lake these traits.

Objectives

The following objectives will be selected for this study -

- To find out Organizational Climate of IASE Colleges.
- To find out Organizational Climate of CTE Colleges.
- To find out Organizational Climate of B.Ed. Colleges.
- To compare Organizational Climate of IASE, CTE and B.Ed. colleges.

Methods

In the completion of the present study normative survey method was used.

Sampling

The total number of 10 Principals from IASE (2), CTE (8) were selected with quota sampling method. One CTE college could not be part of this study. Thus, total of 7 principals of CTE colleges were selected. There are total 773 private B.Ed. colleges in Rajasthan. So 100 principals of B.Ed. colleges were selected by random sampling method. The total number. of Lecturers selected was as follows-

- The total number of lecturers selected from IASE Colleges = $3 \times 2 = 6$
- Total number of lecturers selected from CTE College = $3 \times 7 = 21$
- Total number of lecturers selected from General B.Ed. (Gen Colleges) = $3 \times 100 = 300$

A prototype profile was prepared by Halpin in his research work to find out the organizational climate. In this study the researcher has used the same prototype profile to find out the Organizational Climate of IASE, CTE and B.Ed. colleges. The standard prototype profile is given in the following table.

Table 1: Prototype profile for identify six organizational climates

Climate	Group behavior				Leader behavior			
	D	H	E	I	A	P	T	C
Open climate	L	L	H	H	L	L	H	H
Autonomous	L	L	H	H	H	L	H	AV
Controlled	L	H	AV	L	L	H	AV	L
Familiar	H	L	H	H	L	L	L	H
Paternal	H	L	L	L	L	H	AV	H
Closed	H	H	L	AV	H	H	L	L

Source : Andrew W. Halpin, (1973)

Results

Objective:1 To find organizational Climate of IASE Colleges

To identify the Organizational Climate of IASE colleges, after data collection the z-score was calculated in each and every area of tool. It is given below in Table 2.

Table 2: Analysis of organizational climate condition in IASE colleges

Area	Sub-area	Z-score	Class
Group Behavior	1. Dis-engagement	73.2	H
	2. Hindrance	54.7	H
	3. Espirit	74.1	H
	4. Intimacy	56.7	H
Leader Behavior	5. Aloofness	74.9	H
	6. Production Emphasis	59.7	H
	7. Thrust	80.5	H
	8. Consideration	46.7	L

According to Table 2, sub-areas of group behavior like dis-engagement ($z=73.2$), hindrance ($z=54.7$), esprit ($z=74.1$) and intimacy ($z=56.7$) are found in the category of high according to the norms table.

Sub-areas of leader behavior like aloofness ($z=74.9$), production emphasis ($z=59.7$) and thrust ($z=80.5$) are found in the category of high and consideration ($z=46.7$) is found in category of low according to the norms table.

According to prototype profile, all sub-areas of group behavior viz. dis-engagement, hindrance, esprit and intimacy are found high. The z-score characteristics of above sub-areas shows that climate conditions are very close within the span of familiar climate. But a complete familiar climate was not found in group behavior of IASE colleges.

Similarly, most of the sub-areas of leader behavior viz. Aloofness, Production emphasis and Thrust are found high except consideration which was found low. These characteristics of above sub-areas show that climate conditions are very close within the span of closed climate. But a complete closed climate was not found in the leader behavior of IASE colleges.

In this way, there was no particular complete climate found in IASE colleges. The Organizational Climate of IASE colleges vary in two different climates- familiar and closed climate.

Objective : 2 To find out Organizational Climate of CTE Colleges

To identify the Organizational Climate of IASE colleges, after data collection the z-score was calculated in each and every area of tool. It is given below in table 3.

Table 3: Analysis of organizational climate condition in CTE colleges

Area	Sub-area	Z-score	Class
Group Behavior	1. Dis-engagement	67.6	H
	2. Hindrance	55.9	H
	3. Espirit	75.2	H
	4. Intimacy	60.5	H
Leader Behavior	5. Aloofness	70.9	H
	6. Production Emphasis	57.9	H
	7. Thrust	46.3	L
	8. Consideration	49.7	LA

According to the table 6.3 and graph 6.2 sub areas of group behavior like dis-engagement ($z=67.6$), hindrance ($z=55.9$), esprit ($z=75.2$) and intimacy ($z=60.5$) are found in high category according to the norms table.

Sub-areas of leader behavior like aloofness ($z=70.9$), production emphasis ($z=57.9$) are found in the category of high and consideration ($z=49.7$) is found in low average while thrust ($z=46.3$) is found in low category to norms index.

According to the prototype profile, all sub-areas of group behavior viz. dis-engagement, hindrance, esprit and intimacy are found high. The z-score characteristics of above sub-areas show that climate conditions are very close within the span of familiar climate. But a complete familiar climate was not found in group behavior of CTE colleges.

Similarly, most of the sub-areas of leader behavior like aloofness, and production emphasis are found high and other two sub areas like consideration and thrust viz. Low average and low. The z-score characteristics of above sub-areas show that climate condition is very close within the span of closed climate. But a complete closed climate was found in the leader behavior of CTE colleges.

In this way, there was no particular complete climate found in CTE colleges. The Organizational Climate of CTE colleges vary in two different climates, familiar and closed climate.

Objective : 3 To find out Organizational Climate of B.Ed. Colleges

To identify the organizational climate of B.Ed. colleges, after data collection the z-score was calculated in each and every area of tool. It is given below in following table –

Table 4: Analysis of organizational climate condition in B.Ed. colleges

Area	Sub-area	Z-score	Class
Group Behavior	1. Dis-engagement	55.6	H
	2. Hindrance	49.5	HA
	3. Espirit	47.8	LA
	4. Intimacy	45.2	L
Leader Behavior	5. Aloofness	48.0	LA
	6. Production Emphasis	68.5	H
	7. Thrust	48.6	LA
	8. Consideration	45.9	L

According to the Table 6.4 and graph 6.3, among all sub-areas of group and leader behavior only two areas dis-engagement ($z=55.6$) and Production emphasis ($z=68.5$) were found high and other three sub-areas like esprit ($z=47.8$), aloofness ($z=48.0$) and thrust ($z=48.6$) were found in low average and some areas like intimacy ($z=45.2$) and consideration ($z=45.9$) were found in low category. Only one area hindrance ($z=49.5$) is found in high average category.

As we can see, the z-score characteristics in above all areas show that climate conditions are very close within the span of paternal climate. But a complete paternal climate is not found in B.Ed.colleges.

Thus, the organizational climate of B.Ed. colleges is found very near to the paternal climate.

Comparison between Organizational Climate of IASE, CTE and B.Ed. Colleges

To identify the organizational climate of IASE colleges, after data collection the z-score was calculated in each and every area of tool. It is given below in following table.

Table 5: Comparative analysis of organizational climate conditions in IASE, CTE and B.Ed. colleges

Area	Sub-area	IASE		CTE		B.Ed.	
		Z-score	Class	Z-score	Class	Z-score	Class
Group Behavior	1. Dis-engagement	73.2	H	67.6	H	55.6	H
	2. Hindrance	54.7	H	55.9	H	49.5	HA
	3. Espirit	74.1	H	75.2	H	47.8	LA
	4. Intimacy	56.7	H	60.5	H	45.2	L
Leader Behavior	5. Aloofness	74.9	H	70.9	H	48.0	LA
	6. Production Emphasis	59.7	H	57.9	H	68.5	H
	7. Thrust	80.5	H	46.3	H	48.6	LA
	8. Consideration	46.7	L	49.7	LA	45.9	L

According to the Table 5, the academic staff members of IASE and CTE colleges have high category in all sub area like dis-engagement, hindrance, esprit and intimacy. This result shows basic characteristics of familiar climate, "Let's All Be a Nice Family". The members of this organization satisfy their social needs, but pay relatively little attention to social control with respect to task accomplishment. As we can see one sub-area hindrance is found high points out, staff members either facing more competitive environment or other work related problems.

Similarly, most of the sub-areas of leader behavior like aloofness, production emphasis, thrust and consideration are reflect closed climate. This result shows that principal gives much emphasis on work out puts. He wants to create an environment of hard work. He also tries to give examples but as we can see, one sub-area, consideration shows that principal face somewhat dis-satisfaction of their staff members.

According to Table 5, all sub-areas of group and leader behavior like dis-engagement, hindrance, esprit, intimacy, aloofness, production emphasis, thrust and consideration are somewhat reflect paternal climate. As result shows, the basic characteristics of this climate, "Daddy Knows Best". The principal constrains the emergence of leadership that acts from the group and attempts to initiate most of these acts himself. The leadership skills within the group are not used to supplement the principal's own ability to initiate leadership acts. Accordingly, some leadership acts are not even attempted. In short, little satisfaction is obtained in respect to either achievement or social needs; hence, esprit among the members is low.

In nut shell, the Organizational Climate of IASE and CTE colleges vary in two different climates-familiar and closed climate. There is no particular climate found in both of colleges. The Organizational Climate of B.Ed. colleges are found paternal type.

Conclusion

In the present study, the researcher studied the Organizational Climate of IASE, CTE and B.Ed. Colleges. According to the results, Organizational Climates of IASE and CTE colleges varied in two different climates The familiar and closed climate. There was no particular climate found in both the colleges. The Organizational Climate of B.Ed. colleges were found to be of paternal type.

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Factors Associated with Teacher Burnout in some Gaborone Secondary Schools in Botswana

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Abstract: This paper discusses factors that contribute to teacher burnout in Botswana. The rationale for this study was to find out from some senior secondary school teachers if there were any factors that prohibit them to be effectively committed to their duties. The methodology of the study was based on the positivistic paradigm using the quantitative method. Data was collected using a closed question type in which possible answers were given using the Likert scale. The findings of the study show that there are a number of factors that contribute to teacher burnout such as poor working conditions of service, unmanageable class size, poor inadequate decent accommodation and inadequate teaching facilities. Finally it is argued that the Ministry of Education and Skills Development has an obligation to improve teachers' terms and conditions of service by ensuring that their remuneration is at par with those with the same qualifications and working at the head office of the same Ministry. Furthermore, the Ministry needs to look for an assessment system that will assess if teachers are teaching as per the requirements and if so what rewards are to be awarded. In the event that certain teachers are not meeting the set requirements what measures should be put in place to assist such teachers to improve to meet the set standards.

Keywords: Burnout, Commitment, Accommodation, Remuneration, discontentment.

Introduction

Teacher frustrations are associated with burnout. Burnout is assumed to be a great public problem which affects professionals at both national and global levels. Leland (1998) posits that it occurs to all the time to all types of people in all kinds of professions. Dworkin, Saha and Hill (2008) describe burnout as a result of alienation involving powerlessness, meaninglessness, normlessness, isolation, and estrangement.

Some researchers argue that teacher frustrations began with the inception of formal education in Botswana around the 1960s. Prior to independence Vanqa (1998) acknowledges that this problem had also been noted by H. Jowitt because it is stated that: there was poor teachers' welfare, there was inadequate supply of qualified teachers, quarters in the district were not decent, and teachers earned meager salaries and taught in poor buildings. After independence, teachers' welfare became the responsibility of the Ministry of Education and over the years the Ministry has come up with policies to address the issues of poor teachers' conditions of service. Some of the policies are: Job Evaluation 1998, the Teacher Performance Appraisal Form 1991, the Secondary Schools Management Project Development Project 1993, Parallel Progression 1993 and Performance Management System 2004. All these policies tried to address the problems of poor working conditions of service, progression within the teaching fraternity and improvement to their jobs. But it seems that these have not addressed the issues that frustrate teachers. Monyatsi

(2003) notes that teachers were not happy with the job evaluation exercise as it linked appraisal of teachers with rewards. Teachers viewed all these policy changes negatively (Monyatsi, 2003) and this has led to some being frustrated and suffering from burnout. It is on this basis that this study was carried out to investigate what factors are contributing to teachers' burnout in some senior secondary schools in Gaborone, Botswana.

Burnout construct

The problem of burnout seemed to be an international one. Maslach, Schaufeli and Leiter (2001) posit that burnout is experienced in countries such as Hong Kong, Europe, USA and other parts of the world. These authors argue that "the work on burnout has expanded internationally and has led to new conceptual models" (Maslach, et al., 2001, from <http://www.annualreviews.org/doi/ab;>) Research on burnout can be traced to Herbert Freudenberger who was a clinical psychiatrist, who used the term burnout to describe the overwork, exhaustion, and frustration he experienced at his practice while treating drug users and indigent people (Croom, 2003). Furthermore, Croom (2003, p.2) states that Freudenberger explained that chronic exhaustion and frustration result from "continued devotion to a goal or principle that has failed to produce a corresponding reward". This working environment is said to affect people differently and such people may experience the following as stated by Maslach et al. (2001, p.1):

- Overwhelming exhaustion, which represents the basic individual stress dimension and includes feelings of being overextended and depleted of one's emotional and physical resources,
- A feeling of cynicism by a victim, depersonalization and detachment from the job, which represent the interpersonal, contextual dimension and includes a negative callous or excessive detached response to various aspects of the job and
- A sense of ineffectiveness and lack of accomplishment which refers to the self-evaluation dimension, and includes reduced feelings of efficacy and accomplishment, feelings of impotence, a lack of achievement of achievement and productivity.

It can be deduced from the above findings that burnout is a result of accumulation of stress over a long period of time. Literature on effective school leadership in Botswana states certain factors which are hindering most schools to be effective. Some of these are inadequate teaching and learning facilities. In addition to these teachers have been complaining that their conditions of service are poor since 2004 national strike (Pheko, 2013). Such an environment might be contributing to poor teachers' commitment which might be resulting in poor students' outcomes.

Study context

In Botswana all teachers for public schools from primary, secondary and technical colleges are employed by the Ministry of Education and Skills Development. These teachers' terms and conditions of service, salaries, teaching load, class size and the legal role the schools have to play are determined by the Ministry as the

employer and the main shareholder. It is on this basis that the Revised National Policy on Education (1994) acknowledges that the complexities and demands of teaching have a profound impact on the teachers' performance and morale (Botswana Government, 1994). But by stating this, the Ministry has not taken an effective action to address pertinent issues that could improve teachers' working conditions of service.

However, literature argues that burnout in the school level can be addressed by improving teachers' salaries (Farber & Ascher, 1991). Furthermore it is argued by Leland (1998) that teacher burnout can be reduced if student discipline is improved. Workload is also cited by Croom (2003) as problem because of the administration's ineffectiveness to alleviate the workload problem. It is evident that teachers continue to complain that their working environment is deteriorating and that could be affecting students' academic outcomes (Pheko, 2013).

Methods

A research design is the glue that holds all the elements in a research project together (Trochim, 2000). The quantitative approach was deemed to be appropriate for this study. The quantitative research is deemed to be objective as information about a phenomenon is expressed in numbers as indicated by Ary, Jacobs and Razavieh, (1996) and therefore is divorced from human emotions. This was appropriate because this study seeks to explain why some teachers are suffering from burnout and its purpose was to get a general view from all participants by indicating this through picking statements that they agree with or not. Fifty teachers were randomly selected from four secondary schools in Gaborone out of a total of 500. It is argued that the quantitative approach is objective hence the statistical and mathematical methods used as tools of analysis were used because they are free from subjective biasness.

Sampling

A sample is a group or subset of the total population (Cohen et al., 2000). Four schools were randomly selected from eleven secondary schools within Gaborone. Then a further random sampling of 500 teachers in these four schools was picked because "all members of the population have an equal and independent chance of being included in the sample" (Ary, et al, p.176). The total number of subjects in this study was fifty teachers which is 10 per cent of the population. The data collected was analyzed through the use of a quantitative data analysis computer program called Statistical Package for Social Sciences (SPSS) version 20. The SPSS is an efficient system for retrieving and sorting information than the traditional card sort method (Creswell, 1994).

Findings

The findings of this study are based on the research questions of this study. The first findings were on whether teachers understand what burnout was. The major discussions are from table 1 to 14. Below is table 1 which focuses on teachers' understanding of the term burnout.

Teacher understanding of burnout The aim was to assess teachers understanding of burnout. Below are options the respondent choose to answer the questions as shown

in the tables below: SA for “Strongly agree,” A for “Agree,” N for “Neutral,” D for “Disagree” and SD for “Strongly Disagree.”

Table 1: Cross tabulation for overwhelming exhaustion by syndrome of emotional exhaustion

		Syndrome of Emotional Exhaustion					Total
		SA	A	N	D	SD	
Overwhelming Exhaustion	SA	9	6	3	0	0	18
	A	1	8	6	2	0	17
	N	1	3	5	0	0	9
	D	1	0	0	1	0	2
	SD	0	0	0	1	1	2
	Total	12	17	14	4	1	48

From Table 1, there were 48 respondents and 50% of them agreed with the statement that burnout is a feeling of overwhelming exhaustion by syndrome of emotional exhaustion. They further agree that it is a state whereby individuals depersonalize themselves and have reduced personal accomplishment. The findings of the study suggest that teacher burnout is a result of both overwhelming exhaustion and emotional exhaustion. 19% Of the participants were non-committal to both statements. However, 8.3% disagreed with the given descriptions of burnout.

Table 2: Cross tabulation for overwhelming exhaustion by cycle of negative exhaustion experiences

		Cycle of negative Exhaustion Experiences					Total
		SA	A	N	D	SD	
Overwhelming Exhaustion	SA	11	5	1	1	0	18
	A	0	13	4	1	1	19
	N	2	4	3	0	0	9
	D	1	0	0	1	0	2
	SD	0	0	0	0	2	2
	Total	14	22	8	3	3	50

In Table 2 the second statement on the understanding of burnout show that from 50 respondents 74% of them (37) agreed that burnout is both an overwhelming exhaustion and a cycle of negativeemotional experiences. The 18 % (9) of the participants were non-committal to the statement while 18 % (9) disagreed that burnout is both an overwhelming exhaustion and negativeexhaustion experiences.

Table 3: Cross tabulation for psychological syndrome by cycle of negative exhaustion experiences

		Cycle of negative Exhaustion Experiences					Total
		SA	A	N	D	SD	
Psychological Syndrome	SA	8	2	0	0	0	10
	A	4	10	3	1	0	18
	N	2	9	5	1	1	18
	D	0	0	0	1	1	2
	SD	0	1	0	0	1	2
	Total	14	22	8	3	3	50

From Table 3, 58% (28) of respondents agreed that burnout is both a psychological syndrome and a cycle of negative exhaustion experiences. In this case 38% (18) were neutral while 8 % (4) disagreed with the statement. Considering the views of the respondents, it can be concluded that the respondents understand burnout as both overwhelming exhaustion and a cycle of negative exhaustion experiences.

Table 4: Cross tabulation for psychological syndrome by syndrome of emotional exhaustion

		Syndrome of Emotional Exhaustion					Total
		SA	A	N	D	SD	
Psychological Syndrome	SA	7	3	0	0	0	10
	A	3	11	4	0	0	18
	N	1	2	10	3	0	16
	D	1	0	0	1	0	2
	SD	0	1	0	0	1	2
	Total	12	17	14	4	1	48

Table 4 shows that there were 48 respondents. Out of these respondents 58% agreed that burnout is a psychological syndrome and a syndrome of emotional exhaustion. There were 38% of respondents who did not commit to the statements while 4% disagreed with the statement. Considering the views of the respondents, it can be concluded that the respondents understand burnout as both a psychological syndrome and as an emotional exhaustion.

Table 5: Accommodation for teachers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	0	0.0	0.0	0.0
	A	7	13.5	14.0	14.0
	N	10	19.2	20.0	34.0
	D	9	17.3	18.0	52.0
	SD	24	46.2	48.0	100.0
	Total	50	96.2	100.0	
Missing	System	2	3.8		
Total		52	100.0		

From Table 5 the respondents were asked if accommodation for teachers was adequate. Responses from participants show that 66 % of disagreed with the statement that accommodation was adequate for them. The respondents who were not committed were represented by 20% while 14% agreed that accommodation was adequate. The number of respondents that indicated that accommodation for teachers was inadequate is high and it can be concluded that most teachers think they have inadequate and indecent accommodations.

Table 6: *Class sizes manageable*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	4	7.7	7.7	7.7
	A	4	7.7	7.7	15.4
	N	4	7.7	7.7	23.1
	D	12	23.1	23.1	46.2
	SD	28	53.8	53.8	100.0
Total		52	100.0	100.0	

The participants were asked if class sizes in their school were manageable. Table 6 shows that 77 % of the participants disagreed that the class sizes in their school were unmanageable. On the other hand 15% agreed that class sizes in their school were manageable.. Only 8% of the participants did not commit themselves to the statement.. Generally the teachers’ responses show that class sizes in their schools were not manageable and as a result they could not offer individual help to students and as a result students become indisciplined in the classrooms and this action increases stress for teachers.

Table 7: *Satisfied with my working condition*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	1	1.9	1.9	1.9
	A	6	11.5	11.5	13.5
	N	15	28.8	28.8	42.3
	D	19	36.5	36.5	78.8
	SA	11	21.2	21.2	100.0
Total		52	100.0	100.0	

In Table 7, teachers were asked if they were satisfied with their working conditions. The responses show that 58.5% of them were unsatisfied with their working conditions of service. On the other hand 13% of respondents were happy with their conditions of service. However, a large number of respondents represented by 29% were neutral to the statement. This is a high level of indecisiveness. But because over half of their respondents indicated that their conditions of service were unsatisfactory it can be said that poor conditions of service is one of the factors that contribute to teacher burnout in Botswana.

Table 8: *Physical surroundings*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	4	7.7	7.7	7.7
	A	6	11.5	11.5	19.2
	N	9	17.3	17.3	36.5
	D	21	40.4	40.4	76.9
	D	12	23.1	23.1	100.0
Total		52	100.0	100.0	

From table 8, the respondents were to report on whether their physical environment was conducive for teaching and learning. 64% of the participants indicated that they

were not satisfied with the environment in which they teach. However, 19% agreed that they were satisfied with their teaching environment. The respondents who were non-committal to the statement were represented by 17%. The high number of respondents who disagreed with the statement implies that teachers are generally not satisfied with their work environment.

Table 9: *Classrooms' physical condition*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	2	3.8	3.8	3.8
	A	7	13.5	13.5	17.3
	N	8	15.4	15.4	32.7
	D	20	38.5	38.5	71.2
	SD	15	28.8	28.8	100.0
	Total	52	100.0	100.0	

Teachers were asked if classrooms' physical conditions were conducive to learning. Sixty seven (67%) were not satisfied with classroom physical conditions because such conditions hinder effective learning. However, 17% of the respondents stated that the classroom physical conditions were conducive for learning while 15 % were non-committal. The results suggest that majority of teachers are enduring unsatisfactorily classroom physical conditions. The results clearly show that teachers will suffer burnout because their classrooms are not conducive for teaching and for students' effective learning.

Table 10: *Burnout results in teachers becoming less committed*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	20	38.5	39.2	39.2
	A	18	34.6	35.3	74.5
	N	7	13.5	13.7	88.2
	D	5	9.6	9.8	98.0
	SD	1	1.9	2.0	100.0
	Total	51	98.1	100.0	
Missing System		1	1.9		
Total		52	100.0		

In Table 10, the respondents were asked to indicate the effects of burnout on them. The responses show that 73% agreed that burnout results in teachers becoming less committed to their jobs while 12% disagreed that burnout has no effect on them. However, 14% of the respondents were non-committal. Deductions from the findings show that a teacher who suffers from burnout has a low morale, feels dejected and demotivated which makes it difficult for such a teacher to be committed to her / his job.

Table 11: *Burnout results in teachers suffering from emotional exhaustion*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	17	32.7	34.0	34.0
	A	24	46.2	48.0	82.0
	N	5	9.6	10.0	92.0
	D	3	5.8	6.0	98.0
	SD	1	1.9	2.0	100.0
	Total	50	96.2	100.0	
Missing System		2	3.8		
Total		52	100.0		

Table 11 shows the respondents' results when asked if burnout has any effect on their emotions. The responses suggest that 82% agreed that burnout has a negative effect on their emotions while 8% of the respondents disagreed. About 10% of the respondents did not commit themselves to the statement. The results indicate that majority of respondents understand that burnout has an adverse effect on their emotions especially that the general public expect them to teach students so that they pass their national examinations despite the fact that both the teaching and learning environments are poor.

Table 12: Burnout results in conflictual relationships with co-workers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	9	17.3	17.6	17.6
	A	22	42.3	43.1	60.8
	N	13	25.0	25.5	86.3
	D	5	9.6	9.8	96.1
	SD	2	3.8	3.9	100.0
	Total	51	98.1	100.0	
Missing	System	1	1.9		
Total		52	100.0		

Teachers were asked to state whether burnout can cause conflict between co-workers and their responses are reported in Table 12. The results show that 61% of the respondents agreed that burnout results in conflict relationships between co-workers. However, 14% disagreed with the statement while 26% were non-committal. The majority of respondents show that conflict amongst colleagues is a result of burnout. Conflict between colleagues can lead to frustrations and lack of teamwork.

Table 13: Burnout results in teachers withdrawing from colleagues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	10	19.2	19.6	19.6
	A	18	34.6	35.3	54.9
	N	16	30.8	31.4	86.3
	D	4	7.7	7.8	94.1
	SD	3	5.8	5.9	100.0
	Total	51	98.1	100.0	
Missing	System	1	1.9		
Total		52	100.0		

In Table 13, respondents were asked to indicate if teacher burnout can lead to colleagues withdrawing from each other. The results show that 55% agreed that burnout causes teachers to withdraw from one another. However, 31% of the respondents were non committal. This is a high number which suggests that respondents were not sure what the statement meant. However, 14% agreed that burnout results in withdrawal of relationship between colleagues. But taking that 55% is more than half of the respondents, it can be concluded that teachers work in silos and this negatively affects teaching because teaching is a team work that requires teachers who teach certain subjects to work together and even to set similar mid- year exams together. However, withdrawals from each other will affect the smooth management of the school and will ultimately makes it difficult for a school head to coordinate and leads school activities efficiently.

Table 14: *Burnout results in less tolerance and patience*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	14	26.9	26.9	26.9
	A	18	34.6	34.6	61.5
	N	10	19.2	19.2	80.8
	D	6	11.5	11.5	92.3
	SD	4	7.7	7.7	100.0
Total		52	100.0	100.0	

Table 14 shows the participants responses when asked to indicate if burnout contributes to intolerance and impatience. The response suggests that 62 % agreed that burnout contributes to teachers; intolerance and impatience.. On the other hand 19% of the respondents disagreed with the statement while another 19% were not committed to the statement. The results formtable 14 suggests that the majority of the respondents agreed that teachers who suffer from burnout are intolerant and impatient to both students and their colleagues.

Table 15: *Burnout results in less sympathy on students*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SA	16	30.8	31.4	31.4
	A	17	32.7	33.3	64.7
	N	12	23.1	23.5	88.2
	D	4	7.7	7.8	96.1
	SD	2	3.8	3.9	100.0
	Total		51	98.1	100.0
Missing	System	1	1.9		
Total		52	100.0		

Table 15 shows the responses of the participants when asked to indicate if they were less sympathetic to students as a result of burn out. The results show that 65% of teachers agreed that they are not sympathetic to students when they experience burn out while 12% disagreed that they are less sympathetic to students when they experience burn out. However, 24% of the respondents were neutral thus indicating a high rate of indecisiveness. The results suggest that burn out makes teachers to be less sympathetic to students and that this affects students' learning negatively.

Discussion

It is evident from the findings that teachers understand what burnout is. The findings of this study suggest that teachers as major players in teaching understand burnout from two perspectives. Firstly, they understand it as a psychological syndrome that occurs as a response to interpersonal stressors on the job (Maslach et al. (2001). This perception is consistent with Dorman (2003) who observes that teachers experience stresses when they interact with students, parents, administrators and other teachers as they have the mandate to ensure that students meet the set standards of accountability. The second perspective is that teachers understand burnout as a prolonged response to chronic and interpersonal stressors on the job. The findings

of this study suggest that teachers have been enduring poor working conditions for a long time and this has resulted in them being exhausted and cynical. Furthermore the findings suggest that all stakeholders in the education system were putting pressure on teachers in the hope that pressure will contribute to the improvement of student outcomes. From these findings it can be concluded that teachers as victims of burnout have suffered due to accumulated stress over time.

According to the findings, teachers also support the perception that burnout is a feeling of overwhelming exhaustion (Maslach et al., 2001). This perception suggests that teachers continue to get tired because they are deprived of their emotional and physical resources. As a result, teachers tend to lose interest in their work and become generally weak both emotionally and physically. Stressful working conditions contribute to teachers' loss of interest in their duties. From the findings of the study, it can be concluded that teacher burnout affects students' learning, affects teaching strategies that could improve performance and as a result there is an urgent need to address its causes.

Causes of burnout

This study has established that teacher burnout emanates from quite a number of different factors such as: inadequate or poor accommodation for teachers, unmanageable class sizes, poor teaching and learning environments and poor teachers' working conditions. All these factors have resulted in teachers' discontentment of their profession. This assertion is consistent with Leland's (1998) observation that burnout is caused by the futility of teachers struggling against factors which they have no control over them.

The findings further suggest that if teachers are not with the type of accommodation that they are given and this has resulted in frustration and stress and consequently contributing to poor execution of duties. Putting students of different academic abilities in one class creates a problem of control and discipline. Furthermore, remedial teaching is not provided to students who need it (Pheko, 2010). This situation has also been observed by Faber's (1998) contention that the inability to successfully reach all students who need help can cause burnout. The results also indicated that teachers are disgruntled with the performance management system (PMS) introduced in 2004. Teachers think the system is tedious and time consuming with little benefits on their part. Poor evaluation systems viewed by teachers are consistent with Fuller's (1993) argument that teachers like any professionals want to be efficacious and for that whatever, new innovations that are being introduced by an employer they must meet their aspirations.

Effects of teacher burnout

The findings of this study indicated that teacher burnout has negative consequences on teachers, students and the school. As the main victims of burnout, teachers have become less committed to their teaching and therefore are not helping the school head to implement any decision that would improve school effectiveness. It is also evident that teachers who suffer from burnout do not cooperate with other teachers in their teaching and any advice from their colleagues is received with confrontation. This creates a hostile environment as suggested by the findings of this study. Hence, teachers do not like their teaching environments and in turn unnecessarily punish

their students which eventually affect students' families. This could result in teachers' nervous breakdown. Realizing this state of affairs, Faber (1998) declares that when teachers have become depersonalized from their students, their job and their families, a sad state of affair is created.

Strategies to address teacher burnout

From this study it has become apparent that it is necessary to take cognizant of teacher's needs. One major strategy to address teacher burnout is the improvement of teachers' working conditions to be at par with their colleagues who are working in the Ministry of Education and Skills Development with the same qualification and similar job profile. The second important strategy would be for the teachers' employer to provide or assist teachers to access decent accommodation. This is necessary because teachers are appointed and allocated duties in different areas of the country which are neither their original places nor homes but eventually settle. Consequently, teachers cannot build their houses in these areas as they are constantly being transferred and as a result the employer should assist them with decent accommodation.

The findings of the study indicate that another strategy would be for the Ministry of Education and Skills Development to introduce an evaluative system that meets both the employers and the employees' needs. Such a system should be able to evaluate and differentiate a teacher who is a good performer from a non-performer and reward him/her accordingly. For non-performers the system should be able to identify subject areas that need assistance and workshops should be conducted to so as to make teachers effective. When some teachers are sent for further training or upgrading, other unemployed graduate should be hired so as to reduce burnout (Lenovo, 2006). In addition, this will also help to reduce unmanageable class sizes to manageable ones which will be in line with the policy contained in the Revised National Policy on Education that large class sizes should be reduced (Republic of Botswana, 1994).

The findings of this study suggest that if these three major problems are addressed then teachers will experience various stresses that contribute to teacher burnout. It is further recommended that the teachers' interaction between students, their colleagues and head teacher will create a cordial relationship that would result in conducive working environments. In this context, head teacher may have a teaching force that would assist them to focus on the improvement of students' results.

Conclusion

It is evident from the findings of this study that some teachers in some of the secondary schools in Gaborone suffer from burnout. The teachers as participants of this study understand burnout to be a psychological syndrome that occurs in response to interpersonal stressors on the job. This occurs because for a long time teachers have been dealing with burnout which created chronic and interpersonal stressors in the teaching profession. It can be concluded that such a situation if left unattended could pose an educational problem for the future in which students are not taught, teachers refuse to cooperate with their colleagues and would result in lack of support for the head teachers in improving students' outcomes. This situation could result in instilling student's indiscipline and the general implementation of decisions and

policies may not be achieved. It is important that strategies that could ensure that there is conducive working environment are developed and implemented to create good working conditions of service that are critical for school effectiveness.

Recommendations

This study has established that poor working conditions for teachers have adverse effects on teacher performance causing burnout which in turn affects student learning outcomes and consequently the school as whole. As a result, the following recommendations are made: the Ministry of Education and Skills Development should improve teachers' working conditions of service the same as their colleagues in the same Ministry with similar job profiles so that they equally enjoy equitable salaries and benefits. It is further recommended that class sizes should be reduced to 35 as recommended by the Revised National Policy on Education of 1994 so that teachers provide adequate individual student help within classrooms during the lesson and provide remedial teaching as well.

It is also recommended that the Ministry of Education and Skills Development develop an assessment system that would help to identify teachers who are worth given rewards and rewarded accordingly. In the event that certain teachers are not meeting the set requirements some measures should be put in place to assist such teachers to meet the set standards. Furthermore, it is recommendation that for future research, participants be selected from some senior secondary schools from rural and semi-urban areas to ascertain the extent to which burnout is affecting them.

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