In-service Mathematics and Chemistry Teachers' Preparedness for Mathematics and Chemistry Courses at the University of Botswana: Issues and Challenges

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ABSTRACT

This research study's aim was to track the paths of chemistry and mathematics in-service students studying for a degree at the University of Botswana who seemed to struggle with degree level concepts in their respective programmes despite holding diplomas in their fields. The authors are lecturers of both methodology and content courses in science and mathematics who became concerned about the seeminglyunderpreparedness of most in-service students for degree courses over the years. The study can be located within a social structuralist theoretical perspective where learning is viewed as a social entity, social structure referring to the ways people are interrelated or interdependent within their cultural mores as is the norm in an academic setting.

The research team identified four categories of operational challenges that the students are most likely to face as university leaners, namely academic, social and emotional, economic and environmental challenges and these formed the basis on which the data collection process ensued. The qualitative methods paradigm was found to appropriate and the study was conducted within the framework of an action research approach. A qualitative research was relevant to the study because it had the capacity to enable the researchers to identify the cognitive views held by in-service students and the meanings they made of their experiences concerning their studies or the program (Hancock, 2004). The research sought to identify where the identified challenges emanated from with a view to make those involved in the academic paths of these learners to take heed of their problems.

The study found that in-service learners are faced with all sorts of problems including lack of accommodation on campus, uncooperative lecturers, the university system which lumps them together with pre-service students making them academic prisoners, large class sizes which render learning a near impossibility for some, and the fast learning pace which does not give some a chance to challenge issues of concern.

Keywords: in-service learners, academic challenges, University of Botswana, action research, social structure

I. INTRODUCTION

This research study aimed at tracking the path of chemistry and mathematics in-service students studying for a degree at the University of Botswana who have been observed to struggle with degree level concepts in their respective programmes

despite holding diplomas in science or mathematics education. The authors, who are lecturers for both methodology and content courses in science and mathematics, became concerned about the seemingly underpreparedness of most in-service students for degree courses over the years.

The study views teaching as a dynamic field with innovations necessitating the upgrading of skills and knowledge of teachers for the successful implementation of educational reforms. The premise is that the professionalisation of teaching requires teachers and teacher educators to be involved in a learning process throughout their entire professional life. The complexity of mathematics and science teaching practices raises a lot of questions for in-service teacher education such as the demands of new curricula, the development of interdisciplinary projects, the introduction of new technologies into classrooms, or the adaptation of teaching practices for different students and contexts (students with learning difficulties, multicultural classrooms, underprivileged schools, adults, analphabetism, etc.).

These challenges demand serious reflections on how to support practicing teachers and other school practitioners who are directly concerned by such issues, and develop means that take into account the differing problems to educate them in tertiary institutions. The study discusses some of the challenges to the in-service education and professional development of teachers from a university academic perspective. It is believed here, that the behaviour and attitudes of teachers towards teaching and learning and their knowledge banks are the result of the impact of both pre-service and in-service training which have a bearing on their professionalism.

The students under investigation obtained their qualifications from Colleges of Education in Botswana to teach integrated science or mathematics at junior secondary schools and have taught for at least 6years before pursuing their degree courses. Various assumptions have been associated with poor performance such as inability of the students to adjust to university (first year and second year)courses. Anecdotal stories from some students and lecturers point to poor subject content background of the learners which leads to theirpoor adjustments to studying abstract concepts in their respective subject specialisms. Some believe that the lecturers' pedagogical content knowledge (PCK) is questionable as they fail to transform their content knowledge (CK) into teachable content.

The research question proposed to guide the study is: "How do thein-service students studying mathematics and chemistry at the University of Botswana cope as a result of enrolling for a Bachelor of SecondaryEducation Degree?" The study intended to explore other factors that could be individual, professional development, program or system related, that affect them.The students' views were explored concerning their personal, emotionaland social readiness to study. It is proposed that their adjustment to studying in the chemistry/mathematics programs and performance are linked to the above.

II. The Theoretical View

We acknowledge that changes in society, particularly the challenges posed by the global economy, demand that all students receive a high-quality education. At a minimum, all must be prepared for education beyond high school. Today, the majority of our teachers work to engage the most diverse, distracted, demanding generation of students our country has ever seen. Many of these kids are victims of a postmodernist pop culture that assaults their physiologies, fractures their attention spans, and breeds a dangerously overdeveloped sense of entitlement.

These factors have a social bearing on the educators' behaviours as they continuously endeavour to deal with them in their daily professional routines. The study can therefore be located within a social structuralist theoretical perspective where learning is viewed as a social entity. Social structure here refers to the ways people are interrelated or interdependent within their cultural mores, that is, the ideas, knowledge, norms, customs, and capacities that they have learned and share as members of a society.The structural method, when applied by different scholars, appears to lead to different interpretations and models. The criticisms launched against structural functionalism, class theories, and structuralism indicate that the concept of social structure is problematic. Yet, the notion of social structure is not so easy to dispense with, because it expresses ideas of continuity, regularity, and interrelatedness in social life.

The dynamism of society is reflected in Hegel's dialectic process in which society transforms itself through contradictions and conflicts. The theory of dialectic suggests that history progresses through the resolution of contradictions within a particular aspect of reality. It was later seized upon by Marx and Engels who posited a materialist account of history that focuses upon the struggles within society. As society forms more complex modes of production, it becomes increasingly stratified, and the resulting tensions necessitate changes within it. This way, Marx "instead rooted Hegel's idealism in a materialist conception of history, and used the method of dialectics as a way of understanding issues, as stages in a process, looking at inner stresses and opposing forces to explain the intrinsic possibilities for change"(Gates, 2000:39). The dialectical relationships between the individual (in-service teacher/student) and social milieu (learning environment) lead to how each individual positions her/himself within the fields of mathematics and chemistry.

Central to these dialectic relationships is the concept of discourse where outer speech is internalised and transformed into inner speech. Impulsive behaviour gives way to behaviour guided by the actor's own symbolic representations of hopes, plans, and meanings. Without playing, conversing, listening to others, and drawing out their own voice, people fail to develop a sense that they can talk and think things through (Vygotsky, 1978). Human cognition, even when carried out in isolation, is inherently sociocultural because it is affected by the beliefs, values, and tools of intellectual adaptation passed to individuals by their culture.

The practical implications are that the truly important 'discoveries' that learners make occur within the context of co-operative, or collaborative dialogues between a skilful tutor (lecturer), who may model the activity and transmit verbal instructions, and a novice (student) who first seeks to understand the tutor's instructions and eventually internalises this information, using it to regulate his/her own performance. The learner's role is to take the language of the verbal instructions and use it to guide her/his own activities. The implication for learning mathematics and chemistry is that cognitive processes which climax in affinity towards or away from these courses are cultivated within collaborative dialogues. This is partly how learners become what they are, how they come to believe in the things they believe in, which give them the impetus to act the way they act.

This study is based on the premise that the behaviours of both lecturers and learners contribute to shaping learners' perceptions of the learning process. The conceptualisation of human behaviour as a social construct begins with the objective structures/subjective agents dichotomy. Marxist theorists make a particular kind of distinction between subject and object. Bennett (1982) notes that the historical dialectic involves a mutually interactive relationship between the subject (human

agents) and the object (the conditions of their existence).

The notion that the human subject is constituted by pre-given structures is a general feature of structuralism, in which subjectivity is determined by structures such as language, cultural conventions and other social forces (Lapsley and Westlake 1988). The subject (participant, viewer, listener, reader) is constituted by the social forces and the power residing in their ability to *position* the subject in such a way that their representations are taken to be reflections of everyday reality.

In the social theory we adopt, reality is constructed by human cognition; that is, the concepts or categories used to describe the world are human creations motivated by human needs. They do not describe reality itself, but are an imposed order governed by prevailing needs, and the activities that seek to satisfy them. The subsequent concepts formed to describe reality are social creations. Humanity in a Marxian understanding lies in freedom and accordingly individual interests, abilities and consciousness are *social* properties. Consciousness too is supra individual since the ideas and the symbols in which they are expressed are shared through discourses.

Gramsci used the term *hegemony* to denote the predominance of one social group over others (e.g. bourgeois hegemony). This represents not only political and economic control, but also the ability of the dominant group to project its own way of seeing the world so that those subordinated by it accept it as *common sense* and *natural* (Gramsci, 1971). Commentators stress that this involves willing and active consent. This is typical for students in the mathematics and chemistry courses who have no choice, but to willingly and actively participate. Commonsense, is "the way a subordinate class lives its subordination" (Alvarado and Boyd-Berrett, 1992:51). We believe that this domination and subordination is played out between university lecturers and students.

Gramsci saw a struggle for ideological hegemony as a primary factor in radical change and such struggle could be located in power relations. In education, these power relations are evident in the everyday running of the school, college or university system.The concept of power is part of our *commonsense(taken-for-granted)* knowledge about the world in which we live and exists within the realm of social interaction. When one speaks of power or groups having power, they mean power within social relationships. Foucault's (1980:89–90) assumption is that "power is above all a relation of force… comes from below… is neither given nor exchanged, nor recovered, but rather exercised and only exists in action."

However, Gates (2000:122) seems to reject this assumption as he asserts that:

> Power… also exists not just in action, but in threat and in closing off possibilities in the generation of dispositions. Power can exert its influence and effect through threats, such that there is not only 'power over' others, but also the potential 'power to' control others.

The education system is the means by which society passes on its culture and traditions from one generation to the next. Educational institutions have influences in the moral and social spheres as well as the spreading of knowledge. They do not only hand down a blueprint for living, but sort learners out so that each learns those parts of the blueprint necessary for the positions s/he will occupy in adult life. Lecturers establish control, attention and motivation using power, which students voluntarily view as acceptable and legitimate, for, by virtue of being 'experts' in their fields, lecturers are seen by students as

powerful humans with unquestionable authority.

Lecturers are in a position where they have to lead and likewise students have defining constraints as subordinates. Both are in situations where the distribution of power is pre-determined outside their control. This distribution is backed by all the external forces of the education system and is sanctioned by law and morality. Lecturers exercise authority by virtue of the positions they occupy and exercise power to control social activities in the university.

> This is because power is invested in individuals and members of groups through their adherence to hegemonic positions – by adopting dominant discourse positions and through their position inside structural relations of domination – by being granted a hierarchical power role over others (Gates, 2000:119).

Lecturers are in this privileged position and use *normative* and *coercive* power (Shipman, 1968) to keep control. *Normative* power rests on the manipulation of symbolic rewards as lecturers praise, grant privileges, demote, promote or criticise and restrict liberty.

According to Goffman (1961), the institution of schooling is analogous with prisons and hospitals, based on twentieth century models and basically authoritarian in structure, paternalistic in their attitudes to the inmates, and insulated from the world at large. Although both teachers or lecturers and children or students spend a proportion of their time at home, attendance is compulsory, the staff have complete charge of the learners, both are expected to conform to a narrowly defined code of behaviour, and there are sanctions on all to ensure compliance. In this sense, educational institutions can be viewed from what Goffman referred to as total institutions. Nevertheless, not all attributes that Goffman assigns to total institutions are applicable to schools, colleges or universities, but "All aspects of life are conducted in the same place under the same authority, the individual is a member of a large cohort, and daily activities are tightly scheduled" (Goffman, 1961:436).

The university exercises some form of despotism, that is, sinceeducational institutions inevitably limit the freedom of students, hostility, domination and subjection are equally inevitable.

> This despotism is somewhat in a state of perilous equilibrium with teacher and pupil confronting each other. Insofar as the aims of either are realised, it is the sacrifice of the aims of the other. Thus for teachers, control as an aim becomes pervasive and superordinate (Waller, 1965:10).

In order to maintain control, lecturers must always take very seriously the social system designed for the edification and control of students. They must speak seriously and even prayerfully of examinations, grades, credits, promotions, demerits, university rituals and others. It is difficult for the lecturer to take such things seriously and yet keep them from entering his/her soul. In the main, the better lecturer s/he becomes, the further they will be assimilated.

The lecturer is torn into two with regard to his/her role. The expectations of the employee role include the observance of rules determined by superiors, the following of uniform procedures, an emphasis on standardised curricula and teaching techniques, and loyalty to the university. In contrast, the professional role is characterised by flexibility in handling problems, emphasis on the application of a body of professional knowledge, autonomy with regard to curricula

and techniques, participation in collective decision-making with regard to the goals of the university and a loyalty to the profession as a whole and its standards.

The lecturer is also charged with the task of establishing and maintaining discipline and order in the classroom. It is the task of who shall do what, when and how - the creation of rules of conduct and rules of procedure. This includes the lecturer's task in organising the grouping of students, the distribution of equipment, the timing, form and extent of movements by students within or in and out of the lecture room. Many of these rules define how the students are expected to treat and respond to the lecturer, as well as to how they must treat each other. Included are the means of maintaining the rules, such as the fixing of rewards and punishments for adherence to or deviance from the rules. As instructor, the lecturer must get the students to learn and show evidence of that learning, evaluating progress and motivating students to want to learn.

From insights on sociological analyses of organisations, we view organisational structure as the control mechanism of the university system, that is, regularities emerge because of exposure to organisational controls. Conflict and struggle over control applies to lecturers as well as to students. Organisational structure is legitimated by appeals to its necessity and inevitability, but its bureaucratic, hierarchical nature and the consequent structure and content or roles has as much, and possibly more, to do with the disciplining of lecturers and students as it has to do with teaching and learning.

Arguably, the lecturer has the power to structure the students' day, define what is to count as knowledge, regulate the patterns of interaction through exercising control over classroom norms and regulations, as well as over the allocation of rewards and punishments through the grading and classification system. Within these overall constraints, however democratic or permissive the lecturer, students carry on their educational 'work' individually rather than collectively and are encouraged for their diligence, social conformity and deference to the lecturer's authority. These social practices are ideologically legitimate by a variety of educational theories whose political content remains hidden from their adherents. For this reason the practices are hegemonic and give rise to *commonsense* knowledge about the world.

Sharp (1980), argued that it is through and in the process of schooling that hegemony is achieved in which *commonsense* is at least partially moulded by dominant (hegemonic) beliefs and practices. The manifestation of the dominant hegemonic ideology at the level of the school incorporates and accommodates both traditional and liberal ideologies and pedagogies.

> *Ideology is the means whereby people become aware of conflicting interests and position themselves therein and it becomes an essential feature in achieving social cohesion through socialisation (Gates, 2000:110).*

Hegemonic beliefs and practices in Africa are reflected in the dominant national culture with its dual heritage and intermingling of African and European cultural dominions. This dual culturalism was the making of the dominant ethnic African tribes and the then European authorities of the colonial era. What constitutes contemporary cultural knowledge in Africa is largely based upon a negotiated compromise within these cultural dualities. For Sharp (1980:102), "Hegemonic beliefs and practices thus shape practical ideologies and penetrate the level of commonsense, mixing and mingling the ideological practices more spontaneously generated."

Part of the socialisation of children and their acquisition of knowledge, which enables

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them to function as adults takes place in schools. The manner in which schools, classrooms and knowledge are socially organised, the material practices and routines, through which learning and teaching take place, provide the socially significant context which mediates any explicit transmission of formal knowledge, concepts and theories. The ways in which hegemonic beliefs and practices are played out in educational institutions provide the means by which society maintains or modifies social structure.

III. The Conceptual Framework

The challenges faced by in-service teachers when learning mathematics and chemistry can therefore be conceptualised within the outlined hegemonic social structures. The authors' experiences in learning Mathematics and the Natural Sciences at University attest to the unfriendliness of the learning environments. Some lecturers had the audacity to pronounce in advance how difficult their courses were and went on to make sure their message was fulfilled by the failure rate of their students. This, as mentioned earlier, makes one to question certain lecturers' pedagogical content knowledge and their ability to transform content knowledge into learnable concepts accessible to students.

In trying to operationalise in-service teachers' preparedness for university degree courses it is essential to conceptualise what "*in-service training*" is, what "*preparedness*" entails and our understanding of "*issues and challenges*" faced by the participants in the study. In-service or adult learners are those chronologically older persons who have a professional qualification and an accumulated practical experience and are entering university to upgrade the qualification. As well as its rootedness on social structure, this study is based on the concept of continuous professional development (CPD), the systematic maintenance, improvement and broadening of knowledge, skills and competence throughout a professional's working life (Kostadinovic, 2011). CPD is a tool that ensures increased retention of professionals and enhanced service delivery (Armour & Yelling, 2004).

The objective of in-service teacher training or professional development is to provide an opportunity for continuous renewal of professional skills and integration of emerging knowledge, attitudes and technologies in the field of education so that teachers can educate students more effectively.In the UK and other western economies, CPD has become an institutionalized policy for its lifelong learning imperatives, personal development, individual development, and updating professionals in the rapid pace of technological advancement, verification and upholding of professional standards and for ensuring competent and adaptable workforce (Fraser, Kennedy, Reid &Mckinney, 2007).It is an emerging global acclaimed virtue for organizational effectiveness and efficiency.It helps to keep the target audience abreast with the current developments and new practices in the education sector, as well as prepare them for the challenges of today's global era.

The concept of preparedness is as much applicable to the in-service teachers as it is to the university lecturers. Two issues are at stake here. First, the majority of in-service teachers graduate from their Diploma courses at Colleges of Education without a sound grasp of the content knowledge necessary for further studies. Due to the absence of a threshold for passing content courses, these teachers largely depend on passing professional studies to become mathematics or integrated science teachers. This has a detrimental effect on the calibre of teachers they become and contributes to their unpreparedness for further education. It may also be causing some anxiety for the teacher when deciding to enrol or not to enrol for further education programs. The Botswana case is more or less similar to the Denmark situation where "the majority of

[adult learners] … are forced or persuaded to [enrol] either … by employers or authorities…" (Illeris, 2003, p. 14).

Second, lectureship in the faculty of Science is independent of initiation into the teaching fields. There is no robust educational training on psychological and pedagogical knowledge to guide their didactical paths. There is a tendency, therefore, to lean on positivist approaches to teaching, that is, to view learners as objects to be manipulated as in laboratory situations without regard for their emotional and moral values. The challenge facing lecturers is demonstrating theoretical and academically responsive pedagogy based on the academic competence to enable all students to learn and to achieve their potential (Richards, Brown, & Forde, 2007). The lack of knowledge on differential learning dispositions between pre-service and in-service learners exacerbates the situation. Therefore, a critical factor in the instruction of adult students is lecturers' awareness of personal appreciation and beliefs.

Conceptualising '*challenge*' becomes a fundamental aspect of this study and there are many facets of the word 'challenge' and hence a need for its contextualization. By 'challenge' in this study is meant 'A test of one's abilities or resources in a demanding but stimulating undertaking' (The American Heritage® Dictionary of the English Language, Fourth Edition copyright ©2000) or some 'difficulty in a job or undertaking that is stimulating to one engaged in it' (Dictionary.com). There are, therefore, insurmountable "issues and challenges" that the in-service teacher faces as a university student. One such challenge is for the student to give up on understanding the taught material and resort to means of maximising grades as a way of avoiding confrontational conflicts and contradictions that we have earlier alluded to. We have identified four categories of operational challenges that the students are most likely to face as university leaners, namely *academic*, *social and emotional*, *economic* and *environmental* challenges.

IV. MATERIALS AND METHOD

The research approach

This is a qualitative methods study conducted within the framework of an action research approach. A qualitative research was relevant to the study because it had the capacity to enable the researchers to identify the cognitive views held by in-service students and the meanings they made of their experiences concerning their studies or the program (Hancock, 2004). The research sought to identify patterns through triangulation of various data sources to enable the selected students to give a better overall understanding of their education path and the teaching of chemistry/mathematics in general. For this reason, questionnaires, interviews and observations were used to collect data.

The population and sampling strategy

The participants in this study are in-service students who hold a Diploma in secondary school teaching and as already mentioned, they were trained to teach either integrated science or mathematics. Two groups of in-service students, one from mathematics (20 respondents) and the other from chemistry (30 respondents) were purposively sampled by the research team who happened to be the lecturers for the said groups respectively.

The data collection process

Data was collected from the students at first and second year chemistry and mathematics at the Departments of Chemistry and Mathematics respectively. Part of the data included looking at the performance of students in tests and assignments.

The data collection procedures included observational anecdotes, open-ended questionnaires completed by the students and follow up interviews by the research team.

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Semi-structured questionnaire items were developed and put through rigorous vetting for validation and reliability. For the reliability aspect, piloting was done on a group at higher level composed of fifteen individuals (8 from Chemistry and 7 from Mathematics).

As Marsh &Hocevar (1991) suggested, the development of a student's evaluation of teaching instrument should follow the general procedure of development of a large pool of items (from literature, existing instruments, interview with students and teachers), piloting the instrument to receive feedback about the items, and consideration of the psychometric qualities of the items while revisions are made.

A framework of effective teaching that guides the development of these instruments was formulated which specified the domain of interest of the study which is a crucial first step in development of an evaluation instrument (Berk, 1979). From this framework, a pool of 130 items was developed linking the teacher effectiveness to challenges that students face in the teaching process. From the pool items four categories relating to students' challenges were identified as*: academic, social and emotional,economic* and *environmental challenges.*

Vetting of the instrument

The instrument was vetted by five lecturers (two mathematics and two chemistry educators and one language lecturer) who advised that some items be removed and some grammatical changes be made to some of the items. This trimmed down the total number of items to 90. The vetting of the instrument was carried out to ensure that the items were explicit and by no means reliably to ambiguous interpretation by respondents.

The 90 item instrument was further subjected to rating by two mathematics and science education researchers who judged how favourable each item was with respect to the construct it was purported to measure using a 5 to 1 rating scale where 5 = strongly favourable to the concept; 4 = favourable to the concept; 3 = undecided; 2 = unfavourable to the concept and 1= strongly unfavourable to the concept was used for this purpose.

Reliability

The Reliability (internal consistency reliability) of the instrument was established by calculating coefficient alpha (Cohen, Manion and Morrison, 2007), using data gathered from a pilot testing of the instruments with 30 year three. Coefficient alpha (a) value of 0.9473 was obtained from calculation using SPSS.

Validity

The instrument underwent content and construct validity tests. Content validity of the instrument was established by grounding the instrument on the established framework of the challenges met by in-service students. The use of the lecturers, students and experts in the field of, mathematics and science education and psychometric tests to vet the instrument was used to further ensure content validity of the instruments (Creswell, 2008). The experts checked that each item in the instrument relate to what it was purported to measure, the scale was of appropriate length and that the language was simple to the understanding of high school students speaking English as second language.

To ascertain that the items from the content validity actually measured what they are assumed to measure construct validity was performed on the items. The correlation between each item and the total (summed) score across all items in each subscale (Trochim, 2006) was computed. The items that correlated highly (0.7 and above) with the summed score in the subscale were selected; dropping out the remaining items. The 64 items that were selected made up the pilot instrument which was pilot-tested with a convenient sample of 15 year three in-service students.

A factor analysisof the result of the pilot test was done and used to determine if the items in the instruments measured the theorised constructs and thus strengthen the validity of the instrument. Principal components (PC) factor analysis was used to determine the factor loadings of the instrument. A preliminary analysis using the output of the R-matrixwas carried out and some items wereeliminated to avoid singularity (Field, 2005). The Bartlett's test of sphericity gave a value of .000. The Kaiser-Meyer-Olkin (KMO) measure of sample adequacy was 0.884, falling in the range of 'great value' and the highly significant values of Bartlett's test ($p < 0.001$) indicated that factor analysis was appropriate for the data (Field, 2005).

Factor rotation was appliedto optimise the factor structure and search for the best explanation of patterns in the data. The plot of the eigenvalues showed that the data were best represented by four underlying factors.The result showed 28 items loaded to *academic challenges*; 18 to *social and emotional challenges*; 8 to *economic challenges* and 10 to the factor of *environmental challenges*.

V. Results and Discussion

The study unearthed a number of challenges faced by in-service students in the mathematics and chemistry departments. The general view from the learners is that they are not being catered for as adult learners but are rather painted with the same brush as their pre-service counterparts. As has been said earlier, four categories of operational challenges that the students are most likely to face as university leaners wereidentified, namely *academic*, *social and emotional*, *economic* and *environmental* challenges. These challenges are represented in both the respondents written and verbal expressions. The discussion below will tackle the challenges as represented by the in-service learners' anecdotes, albeit not in any sequential manner as the issues were juxtaposed and interrelated in most cases.

Relevant courses, resources and materials

The following are some of what the respondents had to say about their lecturers:

> *"They must provide relevantmaterials", "Teach only major chemistry at year 3 and leave out the minor subject… Reduce education courses to 1 or 2 per year … don't examine education courses", "Avoid resources, give guidance and support", "Look into syllabus as we are taught very high material which we aren't going to apply".*

These are the voices of the in-service learners showing their uneasiness with the courses offered and what these courses mean to them. Although we do not support the issue of teaching only material these teacher trainees are going to handle in schools, the issues pertaining to 'high level courses' and 'too many courses' seem to put a lot of pressure on the in-service learners and contribute to their academic challenges.

Lack of tutorials

The lack of provision for tutorials was evident and a matter of concern for the respondents, particularly for the mathematics cohort. They are crying out that tutorials could go a long way to alleviate their learning woes, especially in 'mechanics and calculus'. Sentiments raised include:

> *"Maths department should have maths tutors for mechanics and calculus", "Provided tutors for each maths course", "To have tutors helping us as individuals".*

This is a clear indication that the in-service learners are not coping with the subject matter and need support from in the form of tutors to help them understand the material better.

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Teaching pace

The teaching pace was said to be too fast for the adult learner as suggested by the following:

> *"Accommodate learners who are slow to grasp the concepts", "Cater for all groups of learners", "Reduce the teaching pace, do labs after lecturers", "Reduce the lecture method", "Improve the pace in which they teach – some are very fast and leave out some important steps…", "Teach adults at a reasonably slow pace for them to be able to follow", "Lecturers should take it slowly", "Individual learning should be taken seriously"..*

These are selected views from the in-service learner expressing their agonies in the learning process. This is exacerbated by allegations that lecturers have no time for questions during or after lessons for those who would not have grasped the taught concepts. There is therefore, no room for the adult learner to come to terms with the academic concepts they have learnt given the learning environment they describe.

Separation of adult learners from pre-service learners

This is one the dominant environmental as well as social/emotional challenge for the respondents. The following are some of their voices:

> *"Teach adults as isolated group from pre-service students", "Adult learners should be taught alone at a considerable pace", "Adult learners should be taught alone to cater for their slow pace especially at the beginning of the course", "Adult learners should be taught alone so that we can be free and learn at our own pace", "Allow adult learners to learn on their own and not mix with young ones", "Allow adults to learn alone, not with teenagers".*

The above show a concern for the adult learners that they need a separate environment in which they could express themselves freely without being too cautious in the midst of younger students.

Related to the plea for separation from the pre-service cadre is the way lecturers fail to see the difference between the two groups of learners. These are some of their voices on the issue:

> *"Stop referring to previous year assuming that we were there", "Teaching should consider that during our Diploma some of the material was not covered".*

These and other anecdotes from the in-service learners reveal that lecturers keep referring to previous material, which of course, the in-service learners would not have encountered since they would not have been there the previous year when the material was covered. This exacerbates the issue of pace which then tends to assume that everyone has the same prior knowledge of the concepts being deliberated. The above issues relate to both the in-service learner's academic as well as social/emotional challenges.

Minimise class sizes

The issue of large class sizes which is commonplace in the university was found to be of concern by in-service learners who themselves have found it difficult to cope with even smaller class sizes in their schools. They have had to struggle with the same problem and know the disadvantages this phenomenon brings into education.

In the Faculty of Science they found themselves lumped together with pre-service learners swelling the numbers sometimes to unbearable proportions even for their lecturers. This, combined with the 'fast learning pace' that they have alluded to, makes their academic life a nightmare to say the least. The

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following are some of their views on the issue of what the university could do to help the adult learner:

> *"Having small groups of students in a class", "Minimise class size". "Teach in small groups of adults so that questions cannot be an embarrassment in front of young learners", "Reduce the number of students per class" or teacher/student ratio".*

A conducive learning environment, to them, is such that individual concerns can be addressed, which is not the case in their situation. It is almost impossible, as their stories indicate, for their lecturers to attend to individual issues given the large numbers, and the tendency is to teach as if they are all from the same educational background as their pre-service counterparts.

A follow-up interview with some of them revealed that they resort to not asking questions due to the fear of being seen as naïve by the younger learners. This has a detrimental effect on their academic progress since they tend to let issues of concern pass by to avoid embarrassment.

All of the above issues, together with lack of accommodation and syllabus concerns form a plethora of the challenges that in-service learners face in an endeavour to upgrade their education from diploma to degree level.

VI. Conclusion

From the questionnaires, class observations and interviews with in-service learners it became clear to the research team that the students were not happy with the whole system of being an adult learner at the University of Botswana. That they were not given a chance to voice their challenges through the different structures of the university is in itself a challenge. They had to do their best to learn under circumstances they would rather avoid given a choice. This is a good example of how hegemonic institutions like prisons, schools, etc. operate. The learner has no voice in what goes on in her/his life as a leaner.

The in-service learners paint lecturers as following the positivist paradigm, where they are like pawns on a chess board ready for manipulation. It is a pity that in-service learners have to endure such hardships in the quest to add to their academic credentials for the benefit of not only themselves but the country as well. It seems lecturers have no time to make a difference between adult learners, who have to juggle between their busy academic schedule and their social lives, and pre-service leaners who have less social problems to attend to.

It was obvious from the students' views that their learning faced all sorts of challenges, from accommodation problems, which make them attend lessons late to uncooperative lecturers who do not seem to care about their adult-learning differentials. The issues of classroom environment which make the in-service learner an academic prisoner, the fast learning pace which livesthem struggling behind, the class sizes which overwhelm them, the lack of proper study places where the adult learner can discuss with others and relax their minds, all form a plethora of challenges that thy have to wrestle with in the name of education.

Hopefully of the voices of in-service learners will be raised high and someone in the authoritative echelons of the university structures will address at least some of their grievances to make their learning more meaningful and fulfilling.

References

Alvarado, M. & Boyd-Barrett, O. (1992).*Media Education: An introduction.* London: BFI/Open University.

Armour, K. M., & Yelling, M. R. (2004). Continuing professional development for experienced physical education teachers: towards effective provision. *Sport,*

Education and Society, 9(1),95-114. http://dx.doi.org/10.1080/1357332042000175836

Bennett, T. (1982).Theories of the media, theories of society. In M. Gurevitch, T. Bennett, J. Curran & J Woollacott (Eds.): *Culture, Society and the Media*. London: Methuen (Part 1, 'Class, Ideology and the Media'). pp.42–54.

Berk, R.A. (1979).The construction of rating instruments for faculty evaluation.*Journal ofHigher Education, 50(5): 650–669.*

Cohen, L., Manion, L., &Morrision, K. (2007).*Research methods in education*. (6th ed.).New York: Routledge.

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. (3rd ed.) New Jersey: Pearson Education Inc.

Davidowwits, B. &Rollnick, M. (2001).Effectiveness of flow diagrams as a strategy for learning in Laboratories.*Australian Journal of Educational Chemistry*, (57), 8-23.

Foucault, M. C. (1980). *Power/Knowledge: Selected interviews and other writings 1972 – 1977*, edited by Colin Gordon, Briton: Harvester Press.

Fraser, C., Kennedy, A., Reid, L., &Mckinney, S. (2007). Teachers' continuing professional development: contested concepts, understanding and models. *Journal of Inservice Education,33*(2), 153-169. http://dx.doi.org/10.1080/13674580701292913

Gates, P. (2000). *A Study of the Structure of the Professional Orientation of Two Teachers of Mathematics: A Sociological Approach*.Ph.D. thesis, University of Nottingham.

Goffman, E. (1961). *Asylums: Essays on the Social Situation of Mental Patients and Other Inmates*. Anchor Books, 1961, Doubleday (New York City), 1990.\

Gramsci, A. (1971). *Selections from the Prison Notebook.* Translated and edited by Quintin Hoare & GeoffretyNowell-Smith, London: Lawrence &Wishart.

Hancock, E. S. (2004). Preservice science teachers' beliefs about teaching and learning: The influence of K-12 field experiences. *Journal of science education*, 15 (4): 281- 191.

Illeris, K. (2003). Adult education as experienced by the learners. *International Journal of Lifelong Education, 22*(1), 13-23. http://dx.doi.org/10.1080/02601370304827

Kostanodivic, D. (2011). Education and Continuing Professional Development.*Journal Plus Education, vii* (2), 126-136.

Lapsley, R. & Westlake, M. (1988).*Film Theory:An Introduction.* Manchester: Manchester University Press.

Marsh, H. W., &Hocevar, D. (1991). The multidimensionality of students' evaluations of teaching effectiveness: The generality of factor structures across academic discipline, instructor level, and course level. *Teaching & Teacher Education, 7(1), 9-18.*

Richards, H., Brown, A., Forde, T. (2007). Addressing diversity in schools: Culturally responsive pedagogy. *Teaching Exceptional Children, 23* (3), 64-68.

Sharp, R. (1980).Knowledge, Ideology and the Politics of Schooling. London: Routledge & Kegan Paul.

Trochim, W. M. K. (2006). Research knowledge base. Retrieved February 18, 2010, from http://www.socialresearchmethods.net/kb/scallik.php.

Vygotsky, L. (1978). Mind in Society: The Development of Higher Psychological Processes. Cambridge, MA: Harvard University Press.

Waller, W. (1965).*The sociology of teaching*. New York: John Wiley & Sons, Inc.