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AN INTEGRATED IN-SERVICE PROFESSIONAL DEVELOPMENT MODEL PROPOSED FOR AGRICULTURE TEACHERS: IMPLICATION FOR IMPROVED IPD POLICY AT THE CENTRAL REGION OF BOTSWANA

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ABSTRACT

This paper presents a conceptual model generated as part of the major mixed methods study, which among others, intended to point at changes that could lead to improved In-service Professional Development for agriculture teachers in the Central Region of Botswana. The study explored the views of all 247 agriculture teachers in the region and 8 Education Officers on how they found IPD opportunities in the region. Structured questionnaires (r= 0.89) and face to face interviews (n=32), which were subjected to a series of reliability checks, were used to gather data for the study. Part of the recommendation was the need to adopt an Integrated IPD model which this paper publicises. The proposed conceptual model is found to be having far reaching implications for IPD policy at regional and national levels in Botswana.

KEYWORDS: Agricultural Education; In-Service Training; Model & Professional Development

INTRODUCTION

In Botswana, the In-service Professional Development (IPD) of teachers has always been an important concern for the two main commissions of education (Republic of Botswana, 1977: Republic of Botswana, 1994a). The 1976 commission found professional development interventions likely to better teacher morale and encouraged teachers to engage in them (Republic of Botswana, 1977, p.133). Additionally, the commission suggested to the then authorities that there should be a framework and support services for professional development. On its part, the 1993 commission suggested widening scope for professional development by recommending that it should cater for both the professional growth of teachers and the supervisors (Republic of Botswana, 1994a). The commission further suggested a shift in viewing IPD that it should not only be focussing at

> Upgrading untrained teachers or those …under-qualified, but rather a continuing means of
> Strengthening and reviewing the education system through development of teachers'
> Competence and sense of professional commitment (Ibid. p.353)

In response to these reports, efforts to improve teacher quality were made and some are /;Planned for (ETSSP: 2015-2020) despite the many challenges that face education.

Echoing some of the challenges was the task force which drafted the national in-service training policy for teachers (Republic of Botswana, 2010). The task force noted that the teachers' IPD provisions have been running without a well-defined IPD framework ever since the inception of in-service unit. According to the taskforce report, the results of the

lack of a well-defined in-service training framework were that:

> In-service training was limited, hence a number of teachers would go on for too long without any training. … Obsolescence became inevitable and Consequently, this affected the quality of delivery in the classroom (Republic of Botswana, 2010. p.7).

This excerpt indicates how limited the IPD initiatives offered to teachers in Botswana have been without a guiding framework or model. A 'model' here I mean the overarching framework of IPD meant to guide the provisions offered to teachers in a given setting. It is seen by Joyce and Calhoun (2010) as 'a prototype, a pattern that, in education, can be used to. guide deliberate actions' (p3)geared towards supporting learning by teachers in this case.

PURPOSE AND OBJECTIVES OF THE STUDY

It is from the above realization / understanding that the development of a conceptual framework or model was muted to aid understanding as to how best IPD opportunities could be structured to effectively support teacher effectiveness and ultimately improve students' academic performance. The specific objective for the study was: to develope an IPD framework or model that could guide agriculture teachers' IPD opportunities at regional, school and classroom level.

METHODOLOGY

Given that the presented model had to be contextualised and grounded on the teachers' views, an empirical data had to be collected. The research was approached from a flexible pragmatists' perspective of studying human reality both objectively and subjectively, thus adopting a mixed method design (Creswell and Plano-Clark, 2007). Consequently, both structured questionnaire (r=0.89) and structured interviews were used to collect data from all the secondary agriculture teachers (n= 247) in the Central Region of Botswana and Education Officers (EO's) (n=8) who offered supporting information.

Qualitative data were coded and analyzed using NVivo software. Segments of the interview transcripts were coded and given 'segment labels' (Coffey and Atkinson, 1967, p. 170) which did not initially exist in the data. For quantitative data, both descriptive and inferential statistics were computed using SPSS software. The convergence triangulation variant was adopted to mix quantitative and qualitative data sets, which were collected, analysed, and interpreted at (approximately) the same time (Creswell and Plano Clark, 2007).

RESEARCH FINDINGS

To avoid repetition in reporting the findings, it was chosen to keep reflecting such findings along the explanation of the model. This position considers the fact that the model mainly addresses IPD short-comings revealed by the study and are bound to be indicated as gaps to be closed by the features of the model.

Basis of the Model

It is on the bases of the research findings and knowledge from existing different models and literature on effective Professional Development (PD) that ideas were drawn to develop what the researcher termed an ''Integrated IPD Model'' discussed in here. Different groupings of PD models have been observed in literature and have thus broadened the

researcher's understanding of the various models of teachers' professional development. Literature including the works of Sparks and Loucks-Horsley, 1989; Adey et al., 2004; Gaible and Burns, 2005; Joyce and Calhoun, 2010; Loucks-Horsley et al., 2010) organizes what is known about staff development into models which currently guide Professional Development (PD) opportunities.

The model's integratedness takes cognisance of the fact that the current education demands fix teachers firmly in place with guided syllabuses, periods, schedules, extra-curricular activities, cross-grades exams and a full load of other obligations carried within 'somehow' ridged cultures (Ministry of Education, 1994). For this reason, the model attempts to offer guidance on how sustained IPD provisions could effectively be organised despite the many obligations faced by the teachers.

In addition to taking into account the aforementioned characteristics, the design process of this model considered the IPD purpose (Republic of Botswana, 1994b: Ministry of Education,1998), nature of agriculture as a subject (Harper et al., 1990: Ministry of Education, 2000: 2010) as well as the local context (Ministry of Education, 1998: Republic of Botswana, 2006:2010: Republic of Botswana 2015b -ETSSP) under which the model will be implemented to render it relevant for agriculture teachers. Other ideas were contributed by the recommendations from some related local studies including those of Mokgatle and Acker (2002) and Hulela and Oladele (2009). So, it is from this background that I have no doubt that if the model could be well received, adequately resourced and adapted accordingly, it could lead to improved and sustained IPD for agriculture teachers in the region.

Integrated IPD Model Explained

Figure 1 below shows the proposed Integrated IPD model. Accompanying the illustration, I offer some detailed explanations to aid the model's conceptualisation by readers. Apart from just articulating the organisational structure, the explanations carries with them suggestions on what implied stakeholders ought to do to close the gaps revealed by the study for the betterment of the future IPD for agriculture teachers.

Diamond: Reflected by the diamond at the heart of the model is the ultimate goal for IPD which is to enhance the academic performance of learners in agriculture and most importantly ensure sustainability of such an enhanced performance. This brings the understanding that teachers' IPD is not offered just for the sake of it: it is purposeful and worth investing on it. The dotted lines from the diamond reflect that all stakeholders at the various phases in the model have this goal serving as the ultimate reason for wanting to employ some improvements in the teaching and learning of agricultural science in schools. Being the centre of attraction, the student performance (in both theory and practical aspects of the subject) would ultimately become a measure of the effectiveness of any IPD intervention for agriculture teachers in the region.

Rectangle One, in the model positions the Regional Education Office headed by the Regional Education Director to oversee all formal IPD operations for agriculture teachers in the entire region. To reduce shortage of manpower found to be a problem and improve efficiency in monitoring the IPD activities in this large region consisting of 92 secondary schools (Republic of Botswana, 2015a), it is proposed here that, at least, ten Education Officers (EOs)- Agricultural Education specialists be employed to work under the supervision of the director. Under this arrangement each EO will be assigned to oversee IPD provisions in about 9 schools in the region.

The double-pointed arrow '**a**' reflects the expected linkage between the EOs at the regional office and each school in the region. Through the downwards direction of arrow '**a**', it is expected that the EOs in charge of agriculture:

- Familiarise themselves with the uniqueness of the overall context of the entire region and individual schools through school visits. They ought to be familiar with the factors and issues that may influence the success and impact of IPD in each school and the entire region. The familiarisation with the local context is encouraged by most professional development writers including Leu and Price-Rom (2006) and Loucks-Horsley et al., (2010).
- Conduct an encompassing needs assessment from students and teachers to guide the selection of IPD strategies and content, given that effective IPD ought to be content focus (Loucks-Horsley et al., 2010). Needs assessment approach suggested in the backward planning model point to the importance of considering the needs of teachers and students, and the society to guide IPD (Steiner, 2004).

On the other hand, the model through the upward direction of arrow '**a**' expects the School Administrators, as immediate supervisors of agriculture teachers, to inform the EOs about the IPD needs of the teachers they might have identified during their supervision exercise. The School Administrators may, in addition, inform EOs of their own administrative needs that may need an in-service support. Arrow '**a**' could point at the possibility that EOs and agriculture teachers in the schools could liaise and have agriculture teachers receive prompt technical support, without having to go through some bureaucratic delays associated with the current arrangement.

Arrow '**b**' indicates the need for constant communication between the Regional Directors' office and the EOs at the Education Centres. The suggestion takes cognisance of the fact that the Regional Education office and the Education Centres may not be in the same location. The constant communication would ensure that the IPD challenges in the region are attended to in time. Given that this study found the facilities at the Education Centres out-dated, I suggest that facilities in the Education Centres should be replaced to render them conducive for learning. Again, to render the centres offer authentic venues where agricultural skills could be demonstrated to teachers by experts, the structures for housing crops and animals are to be constructed within each Centre's premises.

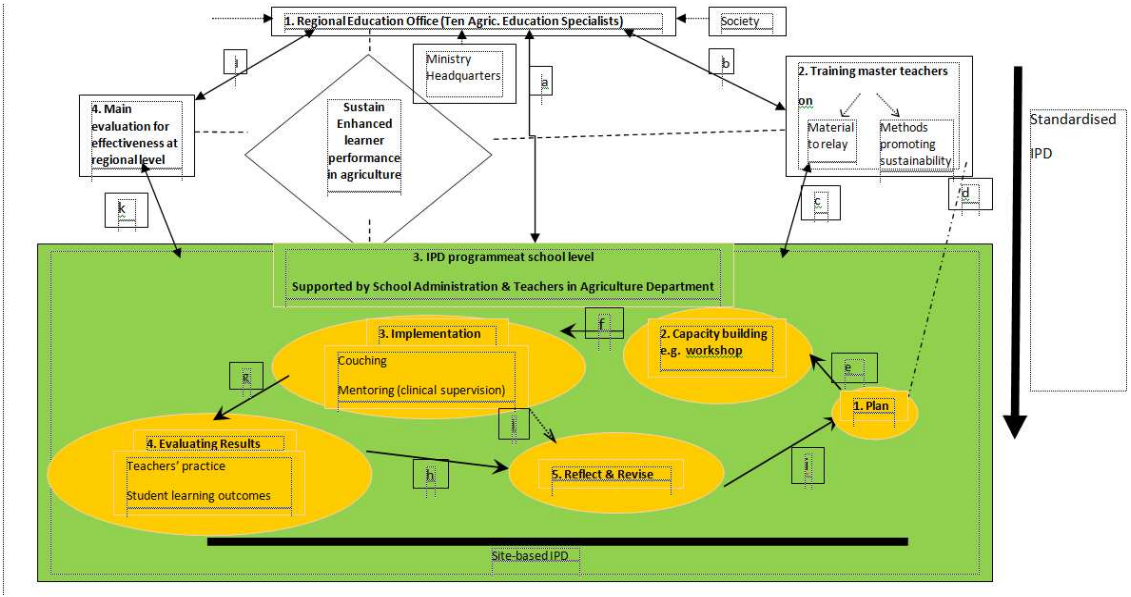

Figure 1: An Integrated in-service Professional Development model for agriculture teachers in the Central Region of Botswana

Rectangle Two, represents the existing Education Centres built to host a group of teachers while on IPD training (Ministry of Education, 1998). The inclusion of this rectangle recognises occasions where the EOs might need to roll out IPD interventions quickly throughout the region through the assistance of teacher trainers. In this case the model suggest that the master teachers (teacher trainers) could be identified by the EOs from each school and are taken to the central point where they would be provided with the required information dictated by the identified needs of the leaners, teachers or even the government.

The downward direction of arrow **'c'** represents invitation of, at least, two agriculture teacher trainers by EOs from each school to attend an out of school IPD opportunity held at the Education Centre, for instance. Given that the study revealed an outcry of late invitations, I suggest that the invitations should be made in time for the teacher trainers to consult the rest of the teachers and prepare for the IPD activity. The upward direction of arrow '**c**' suggests that teacher trainers may contribute to the IPD content to make it relevant to their context. However, the double arrowed '**c'** may also suggest free usage of the Education Centres' facilities by teachers as and when they feel a professional need to meet.

The exposure to the learning experiences at this stage (Rectangle Two) is intensive and of short term thus couching the qualities of the standardised IPD (Gaible and Burns, 2005). As part of the IPD content received from the Centres, teacher trainers ought to acquire both the material to relay to other teachers as well as the dissemination methods to apply. Failure to acquaint teacher trainers with dissemination methods was found to have constrained effective dissemination of material to the rest of the teachers in schools or region at large. Upon the successful completion of capacity building training at the central point, the teacher trainers go back, as shown by dotted-line '**d**', to their respective schools where they would plan and disseminate the information together to reduce the distortion of content commonly associated with cascading.

Rectangle Three, reflects a site-based IPD with the school administration, agriculture department and the individual agriculture teachers playing a crucial role for the success of IPD provisions. The phrase 'site-based' suggests IPD that is held within the school: within a real life situation. At school level, the IPD programmes are driven by the school administration with assistance of Staff Development Coordinator through the department of agriculture down to the individual teachers.

However, the IPD activities here could be either generated by the teachers themselves, the school administration after identifying gaps or those suggested by the Regional Office to have some government policies effectively implemented. Under this arrangement, School Administrators may find themselves having to solicit material and funds to support the school-based IPD opportunities or the implementation of the interventions that come along with them. The administrators may get assistance from the regional office to achieve this. Note that the five circles represent the step by step guide on how any IPD ought to be organized. I will explain this process later on, though.

Still at **Rectangle Three**, the School Administrators may also be expected to instill cultures that promote learning by teachers. The encouragement of sharing resources, and promotion of collaboration amongst the teachers (Day, 1999) may be some of the cultures that might be nurtured within the school. As the other way of promoting sustained learning by teachers, the School Administration could initiate school IPD policy that may recognize the importance of time in learning by teachers: given that different subjects vary in terms of time they demand from teachers to teach. This suggests that the heavy teaching load found to be experienced by agriculture teachers would qualify them exemption from being allocated roles to play during extra-curricular activities. This move may augment the little time teachers have for their professional

development.

In the model, the bold vertical arrow illustrates the qualities for the standardised IPD and the bold horizontal line represents the site-based IPD at school level. The portion that is said to be standardised in this model represents a centralised approach which cascades information to quickly reach out to many teachers. It advocates a top down approach which is also shared by the training model described by Sparks and Loucks-Horsley (1989) and Joyce and Showers (2002)

In this model, I recognise this central approach to be the first layer of this proposed model. At this phase the model suggests that two teachers (labelled 'master teachers') from each school in the region be invited to a central place (Education Centre for instance) and trained to later jointly disseminate the information they leant to their agriculture colleagues in their respective schools. The site-based IPD represent the intensive learning by group of agriculture teachers at school level (own context) over extended period of time. I regard this intensive learning phase to be the second layer of this proposed model with the case where the IPD was initiated from outside the school by EOs, for instance.

The intensive phase could also guide IPD initiated by the teachers themselves. The circles connected by arrows within **Rectangle Three** illustrate the organisational process for designing the on-going agriculture teachers' IPD activities at school or departmental level. This process is shown with IPD provisions held within school because that is where teachers could easily undertake IPD over a period as the integral part of their work. These on-going provisions would afford the teachers chance to plan, implement and evaluate the associated interventions in the relevant context. The process could still be adopted at **RectangleTwo** by the designers of IPD programmes for teacher trainers when taken through tasks. However, short time may limit the effective accomplishment of all the proposed stages. Below I continue to explain the IPD organisational process suggested by the circles in the model.

Circle 1: At planning stage the model recognises the need for IPD designers to consider a wide range of IPD strategies or their possible combinations and choose the strategy or strategies that could together address teachers' PD need(s) at any given time and situation without clashing. In a way, the model considers the importance of combining the virtues of the PD models discussed in literature including the works of Sparks and Loucks-Horsley, 1989; Kennedy, 2005; and Joyce and Showers, 2002. Furthermore, as Loucks-Horsley et al. (2010) suggest, the chosen IPD content ought to be relevant to the needs of teachers and students. Of-course, the choice of the IPD strategies would rely on the IPD objectives which ought to clearly show attributes that need changing with respect to either the teachers' themselves, their practice, or student academic achievement. Clearly stated IPD objectives which reflect intended specific outcomes would ease IPD evaluation exercise (Evans, 2010a).

Proper planning would align the intervention with the local context so that the intervention is rendered meaningful to the teachers. Also, planning at school level takes place for the effective execution of the IPD provisions and associated interventions. The planning has to consider the teachers' interests with respect to the choice of IPD methods used and content given that teachers have preferences (Knowles, 1970:1980). Planning ought to consider other contextual factors that may influence IPD provisions and the associated interventions. These may include issues of time, resources, leadership and school culture as suggested in literature (e.g. Loucks-Horsley et al., 2010). One may need to check if there would be requirement for prior learning by teachers to increase capacity before engaging in the proposed IPD undertaking. If so, one has to plan for such prior learning. In short an encompassing needs assessment proposed in the work of Steiner (2004) is as well encouraged at school level.

Circle 2 represents a capacity building stage, at which teachers are subjected to learning experiences or receive information or skills to be applied in practice. Capacity building could still be done at the school level and could take any strategy deemed relevant. Many of these IPD strategies such as workshops, video shows, etc. are suggested in literature. Once the capacity has been built amongst teachers, the implementation process within the school continues.

Circle 3: During the implementation stage this model emphasizes the need to foster, in the design process, a sequence of learning outcomes that could help effectively change the teachers' beliefs and behaviors. This is a sequence whereby after experiencing IPD teachers are given the chance to try out and put to use what they learned. Thereafter, teachers evaluate the impact of the innovation on students' performance to help decide whether to change the behaviour / attitude or not as the last outcome. As pointed out by Guskey (1986), such a sequence is based on the understanding that teachers' beliefs and behaviors could not simply be changed by just exposing teachers to IPD experiences. They must first realise a convincing reason for them to change, which is a function of their self-regulatory structures that influence the decisions they make (Bandura, 1986), hence the need for time. This suggest that availing adequate time for agriculture teachers to acquire skills, is of paramount importance because according to Cryer and Elton (1993, p.17) 'skills cannot be learned without practice [and] without feedback on performance'. This requirement is represented by arrow 'j' between circle 3 and 5 in the model.

During implementation, teachers are supported through strategies deemed necessary such as coughing, mentoring as well as observations accompanied by prompt feedback. Clinical supervision could also be offered by School Heads or EOs, for instance, to scaffold struggling teachers so that everybody is taken on board to ensure a departmental wide change. At this stage collegiality ought to be inculcated so that agriculture teachers in the department feel free to interact and embrace the spirit of teamwork or collaboration.

As shown by broken arrow **'j'**, running concurrently with the implementation would be the continuous reflection and revision done by the teachers (part of monitoring exercise- formative evaluation). Thereafter, as shown by **Circle 4 Evaluating Results**, summative evaluation of results could be done which may lead to some more reflections and revision **(Circle 5)** as well as more planning, thus starting the circle again as shown by arrows '**h**' and '**i**'.

Circle 5: Reflect and Revise: Here the model considers agriculture teachers to be reflective practitioners (Adey et al., 2004), who ought to be given ample time to reflect on their practice and revise the operations where necessary as part of both formative and summative evaluations. As a result they need not to be rushed to conclusions.

On conclusion, let me state here that at summative evaluation stage (**Circle 4**), the agriculture teachers would reflect on the learning outcomes to see whether they meet the predetermined baseline. The EOs are expected to keep on making regular school visits to monitor progress of the implementation process at each school to ensure that these programmes are rolled out as per initial agreement or revised schedule agreed upon. During the same process, the EOs may gather information to benefit the overall evaluation later at **Rectangle 4**. This monitoring expectation is extended to the school administrators who also are mandated to offer some clinical supervisory support as instructional leaders (Ministry of Education, 1994). The process may continue over a period of time which may take weeks, months, or years until noticeable change either in the teachers themselves (e.g. attitudes), the teachers' practice or students' academic performance is shown.

Once this on-going IPD process at each school is done, then the EOs-Agriculture could round up all the schools to compile a comprehensive report of the effectiveness of the agriculture teachers' IPD in the region and this feedback ought to be safely kept at the Regional Office for future reference. This move is represented by arrow **'L**' which also suggests that the Regional Director could demand such a report. Among other things to include in the report, is the impact that IPD would have done at school and regional levels. There should be a noticeable change in student performance to attest the effectiveness of the IPD programme. And the region could still continue to further identify more IPD needs and roll out more interventions through the model. It is proposed that the ten EOs devise a team-work mechanism to help them achieve the common goal. For instance, ensuring collaborative planning among themselves could benefit them, for they may share limited resources as they endeavour to reach out to schools.

REFLECTING ON THE IMPLIED ORGANISATIONAL STRUCTURE

Just to give an overview of the IPD organisational structure suggested by this model, at the top, the model positions the Regional Education Director who is expected to supervise 10 In-service Education Officers (Agricultural Education specialists).

Other stakeholders in the structure include the teachers, students and the society for it is their needs, in the final analysis, which ought to be met. Initial teacher training institutions are yet other important stakeholders given that IPD might close the gaps in the teachers left by the teachers training institutions. This link has implications for the content of both Initial Teacher Training and the teachers' IPD. The Education Ministry as the main sponsor of IPD opportunities is yet another stakeholder. But is of paramount importance that the government ought to encourage the private sector to also play a role in sponsoring especially subject specific IPD opportunities, for the government alone may not afford this expensive exercise.

Relevance of the Model

I find this Integrated IPD model relevant for addressing the numerous short-comings identified with the current IPD for agriculture teachers which I found to be of structural and operational in nature. For instance, the current provisions are revealed by the findings to be lacking scope for monitoring and feedback. Time availed is inadequate for giving teachers opportunity to think through and put to use the intervention. Various IPD opportunities are offered in isolation hence lack coherence and consistency. They are also sporadic as they aim at solving particular problems as and when they arise. Although this may be also necessary at times, it appears the current IPD do not focus at supporting teachers to grow in their profession by striving to change their practices and behaviours overtime. The cascading approach used in the region has been found, amongst other shortcomings, to be distorting information relayed. The IPD provided also appeared to have been inadequately supported.

The model may offer opportunity to fit various purposes for which IPD might be provided for agriculture teachers in the Central Region. This model may not be a ridged programme hovering on a 'one fit for all' principle for developing teachers denounced by literature (e.g. Adey et al., 2004: Loucks-Horsley et al., 2010). For instance, the model considers three broad scenarios for the formal IPD organization. First, it considers IPD that could be initiated from the regional office by the Education Officers –In-service (EOs) (e.g. region-wide interventions). Second, it considers that which could be initiated at school level either by the administration or department head. Third to be considered is that which could be initiated at the classroom level by individual agriculture teachers which could follow the same organizational process

shown by circles. In fact, for the success of school-wide IPD interventions, teachers as individuals ought to be successful first in managing the interventions as individuals. It is for this reason that the model of active learning espoused by Frost and Youen (2005) could effectively guide individual teachers to manage their own learning with the support they receive from knowledgeable others, of course.

I consider this Integrated IPD model appropriate to support both short-term and long term IPD provisions. By short term provisions I mean those targeting to solve a specific problem at a given point in time. Usually these adopt the top-down approach where in most cases they focus on achieving the needs of the system: giving little focus on the teachers' needs: the tendency which is queried in literature (Hustler et al., 2003). The long term IPD provisions are those that are said to be of 'reform-type' (Garet et al. 2001) for they become part of the day to day events of the school and thus sustained overtime. They are unique to particular schools and stand a greater chance of changing the believes, behaviours and cultures of teachers (Day, 1999: Adey et al., 2004)

CONCLUSIONS

Possible Challenges of the Model

The model may prove expensive for it demands expanded human and material resources to be provided in order to match the current agriculture teachers' IPD demand in the region. Of course, quality goes with expense. Again, given that the model drew ideas from various models developed elsewhere, it might be perceived to be not relevant to the local context. However, given that the context issues were considered to underpin the design of the model, I have no reason to doubt the models' relevance for agriculture IPD at the Central Region of Botswana or Botswana at large.

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