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A Process Model for Developing High Quality Educational Interventions

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Abstract:

Proposed in this paper is a process model tailored to guide the development of high quality educational interventions aimed at improving the quality of education in schools. The process model proposed here is developed on the basis of a study conducted in forty-five Zimbabwean primary schools, four universities, six teachers' colleges and in district and provincial education offices involving one hundred and eleven participants on the development of a school self-evaluation (SSE) framework, a specific educational intervention to be used to evaluate the quality of education in schools. The five-step process model presented here is based on design research, a systematic study of designing, developing and evaluating education interventions used as the research design for the study. Findings point to the need for a process model for developing educational interventions. The main conclusion is that, a process model for developing high quality educational interventions is an essential step towards providing a science base for educational interventions and how they should be developed in order to effectively address various educational problems.

Keywords: design research, educational intervention, process model, quality of education, school self-evaluation, school self-evaluation framework, Zimbabwe.

1. Introduction

Recently, literature and educational researches on the quality of education in general and in schools in particular have been on the increase, (Cheng, 2003; Griffith, 2008; Nyagura, 1991; Smith, 2008; UNESCO, 2004). This was expected to improve the quality of education in schools. However, this increase in research and in literature on quality of education has not resulted in the improvement of quality of education, particularly in most developing countries. With the setting of ambitious international educational goals (UNESCO, 2004), there is growing interest, in many countries, to introduce various educational interventions in order to improve the quality of education in schools.

There is a common belief that education is essential in liberating people from poverty and other related social problems especially in many developing countries. However, this depends on the quality of education students acquire from schools. How to provide education of good quality to students at the various levels of the education system which may contribute in liberating people from poverty remains a multifaceted challenge in most developing countries. Many developing countries have made tremendous efforts in allowing many children access to education and have increased education expenditure significantly over the past years (Gatawa, 1998). Despite all these efforts, the quality of education in many developing countries has remained relatively low compared to the investments made in education. In an effort to improve the quality of education, some countries have developed and implemented many educational interventions, for example, South Africa's 'Whole School Evaluation'; Zimbabwe's 'Mass Education Programme' among others. However, some of these interventions are reported to have failed to impact positively on the quality of education in their respective countries. Gatawa (1998) indicated that there was a quality-quantity dilemma in Zimbabwe's education system during the early stages of Mass Education. On the other hand, Ngcobo and Ngwenya (2005) reported that South Africa's 'Whole School Evaluation' failed because of a lack of negotiation between the Government and teacher unions before its introduction in schools. This failure of educational interventions in some education systems, particularly in many developing countries, may partly be due to the processes leading to their development. Failure to consult and involve the relevant stakeholders in the development of educational interventions may fail to effect the needed changes as some may feel as if the intervention will be an imposition on them (Smith, 1997). This paper, therefore, proposes an encompassing process model which may be used, especially in some developing countries, to develop high quality educational interventions.

Although most developed and some developing countries may have comprehensive educational interventions, some developing countries still lack in this respect. Moreover, even in those countries where comprehensive educational interventions are available, the processes used in the development of these educational interventions are not available. Furthermore, an educational intervention is developed for a specific educational problem and may not necessarily work for other educational problems for which it was not developed for. This implies that every educational problem should have its own intervention specifically designed and developed for

it. Therefore, there is a need to have a process model for developing educational interventions in place so that whenever an educational problem arises, people can quickly use the model to develop the relevant intervention. The process model may assist those who may want to develop educational interventions for their education systems including those in the emerging economies. Whereas the context may differ from the one where this process model was developed, the manner in which the challenges of lack of a processes model to develop educational interventions and how these challenges can be addressed may be similar in nature.

2. Literature Review

Various definitions of an intervention have been given with Tilly and Flugum (1995) viewing it as a planned adjustment of the environment made to alter behaviour in a pre-specified way. Similarly, Fraser and Galinsky, (2010) are of the opinion that an intervention is a purposively implemented change strategy. Therefore, in this study, an educational intervention is regarded as a planned change in an education programme which is aimed at improving quality of education at the multi-levels of education systems, that is, the national, the provincial, the district, the school or the classroom depending on the nature of the problem.

The desire to improve the quality of education in schools worldwide has motivated the development of various educational interventions. To date, several educational interventions have been developed and implemented in various education systems. These include the Scottish's 'how good is our school' school self-evaluation (SSE) framework intervention intended for schools to do self-evaluation of the quality of their education for improvement purposes (The Scottish Office Education and Industry Department, 1996). South Africa also developed and implemented the 'whole school evaluation' intervention aimed at reinstating the supervision and monitoring mechanisms at the school level (South Africa Department of Education, 2002). In England, the 'school inspection framework' used for inspecting schools was also developed and implemented (Office for Standards in Education, (OFSTED) (OFSTED, 1999). In Zimbabwe, the 'Zimbabwe Integrated Teacher Education Course (ZINTEC), a low-cost teacher-training programme, whereby, only two terms of the four-year course were spent in college and the remainder spent teaching in the schools was also developed and implemented (Kanyongo, 2005). Again, in Zimbabwe, the 'Mass Education Programme', which was aimed at increasing education access to the people, was also developed and implemented (Gatawa, 1998), among other interventions.

Although some of these interventions were successful, for example, the ZINTEC programme (Kangai & Bukaliya, 2011), most educational interventions, especially in many developing countries, have failed. Various reasons have been given for the failure of educational interventions. Most of the failures of educational interventions are attributed to lack of resources or resistance from the community for which they are intended (Dorsey, 1989; Gatawa, 1998). For example, South Africa's 'whole school evaluation' was said to have failed because of a lack of negotiation between the Government and teacher unions before its introduction in schools (Ngcobo & Ngwenya, 2005). Similarly, Zimbabwe's mass education programme is reported to have failed during the first decade of independence due to lack of resources, which included infrastructure and trained personnel (Gatawa, 1998). Moreover, its failure was also due to the fact that much attention was paid towards the quantity side of education in terms of the number of students enrolled and their progression through the system with little emphasis on the quality of education they received (Kanyongo, 2005). This is said to have resulted in a quantity-quality dilemma in Zimbabwean education (Gatawa, 1998).

While lack of resources and resistance to change has largely been blamed for failure of educational interventions (Dorsey, 1989; Gatawa, 1998), there are a number of other reasons which may lead to their failure. Providing insight on why most educational interventions fail to impact educational practice, Mayer (2005:68-71) identified the following problems:

- i) basing educational interventions on mottos where statements, mostly of what experts have said, are considered as a basis for the introduction of educational interventions;
- ii) basing interventions on doctrine where these are based on major doctrines currently driving educational practice, for example, constructivism;
- iii) basing educational interventions on political agendas;
- iv) failing to base educational interventions on appropriate measurable goals; and
- v) failing to base educational interventions on a methodologically sound research base.

Summing up, we can deduce that the most common reason why most educational interventions fail is that the processes involved in their development are flawed. Without a process model which can guide the development of educational interventions, we are likely to continue facing unique challenges to the successful design, development and implementation of effective educational interventions which can help to improve the quality of education in schools.

While research in educational interventions has paved the way for major advances to be made in improving the quality of education, most of them have, however, failed to articulate a specific process model that may lead to the development of high quality educational interventions. For example, Palalas & Anderson, (2013) designed a mobile learning intervention for language learners where they proposed steps to be followed when designing and developing the intervention. Similarly, Ivey (2013) did a study on developing an intervention to increase engaged reading among adolescents. Likewise, Mafumiko, Voogt and Van den Akker (2013) designed micro scale chemistry experimentation in Tanzanian schools. Rothman and Thomas (1994) outlined the systematic development of interventions. Put together, these existing models provide a good starting point for design principles and steps to be followed in the development of educational interventions. However, no particular process model has been developed to guide the development of educational interventions particularly in most developing countries. In the absence of an explicit process model for developing educational interventions, considerable confusion may occur in their development. However, goals can be clarified, arguments resolved and outstanding research accomplished when reference is made to an explicit, high quality process model proposed in this paper (see Figure 1). Progress is made from the beginning to the end of the process model towards helping researchers and

educationists to understand how to design and develop high quality educational interventions which may help to improve the quality of education.

2.1. Critical areas that require Educational Interventions in Schools

Educational interventions are needed at multi-levels of the education system (pre-school, school, tertiary and national). Since our focus is on quality improvement in schools, we discuss here educational interventions that aim to improve quality of education in schools. To focus our analysis, we feel that educational interventions that place emphasis on the following aspects are vital in terms of improving the quality of education in schools:

- Leadership and administration;
- Teaching and learning; and
- Resources and infrastructure

2.1.1. Leadership and Administration

Some educational interventions target the leadership and administration in schools. Good leadership and administration has long been found to be essential in the achievement of effectiveness in any organisation, with schools being no exceptions (Calitz, Fuglestad & Lillejord, 2002; Latchem & Hanna, 2001). Effective school leaders should be sources of direction and instruction in schools (Cronje, Du Toit, Marais & Motlatla, 2004) which should eventually lead to the realisation of quality of education. This is particularly so for such leaders have the capabilities of directing and influencing the school staff towards the achievement of predetermined educational goals (Leithwood & Duke, 1999). Furthermore, effective school leaders should also be instructional leaders who should focus on teaching and learning, including the professional learning of teachers as well as students' growth (Bush, 2007). In the past, in most developing countries, school administrators were promoted based on experience with no formal training in administration and financial management. There may be a need to have interventions targeted at school administrators to help them acquire the necessary skills which may help to improve quality of education. Such interventions may be developed for the district, provincial or the national level. However, recently, educational administration has been introduced in most educational courses and this is expected to help improve school administrators' effectiveness.

2.1.2. Teaching and Learning

There is abundant literature on educational interventions centred specifically on teaching and learning processes that have profoundly advanced our understanding of quality of education in schools (Brown, 1992; Levin, 1994; Mafumiko, 2006; Tecele, 2006). While the insights gained from these interventions is remarkable, it is becoming evident that there are unique problems that are likely governed by the dynamics of individual teachers and students in schools. Some of these problems may have significant consequences on the quality of education in schools. For this reason, it is vital to have interventions that target teachers and students so as to enhance teaching and learning processes. It has been shown that investments in teacher quality may be related to improvement in student performance (Darling-Hammond, 1999). Similarly, teachers who are able to use a variety of strategies and a range of interactional styles in the teaching and learning processes to cater for the different needs of the students tend to be successful (Doyle, 1985). It is of vital importance to invest in teaching and learning quality interventions since many reforms in education cannot be successfully implemented without investments in teachers' capacities to implement the intended interventions (Darling-Hammond, 1998). Therefore, there should be interventions targeted to improve teachers' professional skills so that they may impact positively to all students' learning.

Teaching and learning interventions should also be focused on the students. Learning intervention programmes which aim to maximise each individual student's success are the most common educational interventions in schools, districts, provinces or at the national level. These interventions aim to address the needs of individual students with various learning needs (Knoff, 2009; Burns & Gibbons, 2008) which cannot be realised through the provision of mainstream education. Contrary to schools' traditional beliefs that students' failure to succeed in learning meant the student must, therefore, have a disability (Prasse, 2009); educational intervention research assumes that when students struggle in their learning processes, it is as a result of not being taught properly (Ibid, 2009). Therefore, in order to help all students learn effectively, interventions should be developed which address problems that may hinder students to learn successfully.

2.1.3. Resources and Infrastructure

Interventions aimed at improving resources (both human and material) and infrastructures are also vital to educational improvement in schools. Research is consistent that adequate supply of teaching and learning resources in schools is essential in order for quality of education to be realised (Mohammed & Kumari, 2007; Nyagura, 1991; Riddle & Nyagura, 1991). Correspondingly, shortage of trained school practitioners may negatively affect the quality of education in schools as witnessed during the early stages of 'Mass Education' in Zimbabwe (Gatawa, 1998). Such a conclusion finds support in literature which suggests that teacher quality has a significant impact on the teaching and learning processes (Darling-Hammond, 2006; Hopkins & Stern, 1996). School infrastructure is important in influencing the quality of education in a school. Although some may argue that it is not the buildings that educate students (Oertel, 2005); the school buildings have a bearing on the quality of education provided in a school in that they provide enabling conditions for effective teaching and learning to take place. Although what goes on in a school and in classrooms may be far more important than the buildings, in terms of teaching and learning, school buildings should inspire learning. School infrastructure such as sanitary facilities, a clean water supply and adequate classrooms may influence how well students learn (Earthman, 2004).

Therefore, interventions aimed at improving resources and infrastructures in schools are important for they may help to enhance the quality of education.

Although a number of educational interventions may produce meaningful effects on cognitive and schooling outcomes, not all interventions may be equally effective. Much has been discussed about the effectiveness of educational interventions (Gatawa, 1998; Ngcobo & Ngwenya, 2005) but this has been reduced into a binary qualitative model where educational interventions are said to be either effective or not. However, within this binary model, the efficacy of the interventions should be established for some interventions' efficacy may be too low to improve the identified problems. The major innovation in our work is that the process model for developing high quality educational interventions is based on design research, a systematic study of designing, developing and evaluating educational interventions for complex problems in education practice (Plomp, 2009). Design research acknowledges the importance of developing educational interventions in conjunction with the practitioners and other stakeholders in education. Therefore, the process model reported here is based on a systemic approach to solving educational problems by researchers and the relevant stakeholders in education and hence, it is expected that educational interventions developed through this process model may have a high efficacy in addressing the identified problems.

3. Research Design and Methods

This paper is based on a study conducted in Zimbabwean primary schools on the development of an SSE framework, a specific educational intervention for use in monitoring and evaluating the quality of education in schools and classrooms. The aim of the study was to identify and understand the characteristics of effective SSE frameworks with the intention of developing one for use in this context. The research question for the study was thus: *What are the characteristics of an effective School Self-Evaluation framework for improving classroom quality in Zimbabwean primary schools?* Through the study of designing and developing a specific educational intervention, an SSE framework for Zimbabwean primary schools, a process model for developing an SSE framework was developed which was the basis of the initial ideas of the process model for developing educational interventions presented here. We report here on the research design and methods used for data collection focusing on the participants and instruments used.

3.1. Research Design

The study on which this paper is founded is based on design research, a systematic study of designing, developing and evaluating educational interventions as solutions for complicated problems in educational practice (Plomp, 2009). Design research has a double yield in that it aims at developing an intervention and also results in design principles or intervention theory (Ibid, 2009) which may be used by others faced with similar problems in their own contexts. Design research is characterised by various phases.

3.2. Phases in Design Research

There are basically three phases in design research which were also followed in this study namely, the preliminary, the prototyping and the semi-summative evaluation phases. The preliminary phase involved identifying the problem in context. After problem identification, a needs analysis was conducted to ascertain the problem in context. A literature review was also conducted as part of the preliminary phase and this resulted in the development of a conceptual framework for the study (Plomp, 2009) (see Garira, 2014 for details) in order to have a clear understanding of the problem and to find effective ways of solving the problem. The prototyping phase involved the development of various prototypes of the process model, which are initial versions of an intervention before the final product is developed and implemented. The prototyping phase aimed at improving the quality of the intervention. The last phase, the semi-summative evaluation, aimed to determine whether the developed intervention met the pre-determined stipulations. This also resulted in recommendations for improvement of the intervention (Plomp, 2009). There are various iterations involved in design research and these are meant to improve the quality of the prototypes until an approximation of the perfect intervention is reached (Nieveen, 1999). During all the phases of design research, various stakeholders in education, which included practitioners and other education officials, were involved. Practitioners' involvement may enhance the probabilities of the practicality of the intervention as well as professionally developing them (Plomp, 2009).

3.3. Characteristics of Design Research

Design research authors mention numerous characteristics of research design which are nicely summarised by (Van den Akker, Gravemeijer, McKenney, & Nieveen, (2006) as:

- Interventionist: design research aims at designing and developing an intervention in a real world setting;
 - Iterative: the research includes cycles of analysis, design and development, evaluation, and revision;
 - Involvement of practitioners: during the development of the intervention, there is active participation of practitioners in the various stages and activities of the research;
 - Process oriented: the research focuses on understanding and improving interventions;
 - Utility oriented: the merit of a design is measured, in part by its practicality for users in real contexts; and
 - Theory oriented: the design is partly based on a conceptual framework and upon theoretical propositions, whilst the systematic evaluation of successive prototypes of the intervention contributes to theory building.
- (Ibid, 2006: 5).

In developing high quality educational interventions, there are certain criteria to be considered as proposed by Nieveen, (2009) (see Table 1). The process model for developing high quality educational interventions proposed here is based on the criteria for high quality interventions as proposed by Nieveen (2009) (see Table 1).

CRITERION	DESCRIPTION
Relevance (also referred to as content validity)	There is a need for the educational intervention and its design is based on state-of-the-art (scientific) knowledge.
Consistency (also referred to as construct validity)	The educational intervention is 'logically' developed.
Practicality	Expected The educational intervention is expected to be usable in the settings for which it has been designed and developed. Actual The educational intervention is usable in the settings for which it has been designed and developed.
Effectiveness	Expected Using the educational intervention is expected to result in improved quality of education. Actual Using the educational intervention results in improved quality of education.

Table 1: Criteria for high quality educational interventions (Adapted from Nieveen, 2009, p. 94)

Therefore, before designing and developing an educational intervention, effort should be made to establish its relevancy for the intended setting (see Table 1). After the development of the intervention, its consistency, practicality and effectiveness in its intended setting should also be ascertained (see Table 1).

3.4. Method

3.4.1. Participants

A total of one hundred and eleven participants took part in the study. Participants consisted of primary school administrators and teachers, teachers' college and university lecturers, education officials and parents in Zimbabwe. These participants were considered to have an understanding of the quality of education in terms of inputs, processes and outputs at the multi-levels of the education system (national, pre-school, tertiary and school) which would help in determining where educational interventions are desired for quality improvement. The involvement of participants from the various levels of the education system was necessitated by the fact that there is a bi-directional influence of quality of education among the various levels of the education system (see Garira, 2014 for details). In the first phase of the study, fifteen participants took part; the second phase comprised fifty-seven participants while thirty-nine participants partook in the third phase of the study. The sample included both males and females and hence gender-related issues on aspects of the development of educational interventions may have been catered for.

3.4.2. Instruments

Questionnaires and semi-structured interviews were used to collect data for the study. The study utilised open-ended questions which were deemed appropriate than closed-ended ones which provide a yes or no answer which was considered inappropriate information for a study intending to develop a process model for developing for developing educational interventions. The aim of the interviews was to obtain potentially rich data that would help to understand participants' knowledge construction (Bogdan & Biklen, 1989) of the phenomenon under study.

4. Results and Discussion

4.1. Specifications of the Process Model for Developing High Quality Educational Interventions

Educational interventions and their development for use thereof build on the improvement planning process whereby every stakeholder has a role to play in the realisation of quality of education in schools. The process model for developing educational interventions proposed in this paper is best described as a series of five steps (see Figure 1), which those intending to develop such interventions should be familiar with and follow. The rationale for the involvement of various stakeholders in the development of high quality educational interventions proposed in this paper is rooted in the collaborative approaches to interventions development. In this collaboration, researchers, together with education practitioners as well as other stakeholders in education, should assume an active and substantive role across all steps of the development process of educational interventions including their implementation (de Boer, Donker, & van der Werf, 2014; MacBeath, 2006). The process model described here is based on a study that was conducted in Zimbabwe as well as on a large body of literature on educational interventions. Although currently literature on process models for developing educational interventions especially for developing countries is limited, the steps recommended in this paper are drawn

from what is known about the nature and characteristics of educational interventions. Based on the study that was conducted in Zimbabwean primary schools, we managed to develop a process model for developing high quality educational interventions as discussed next and presented in diagram form in Figure 1.

This section describes our process model for developing educational interventions. The development process model presented here is generic in nature and may be adapted to suit different educational contexts. It is hoped that it will form a springboard on how educational interventions should be developed and may also encourage debate on how educational interventions should be developed with the aim of improving the quality of education.

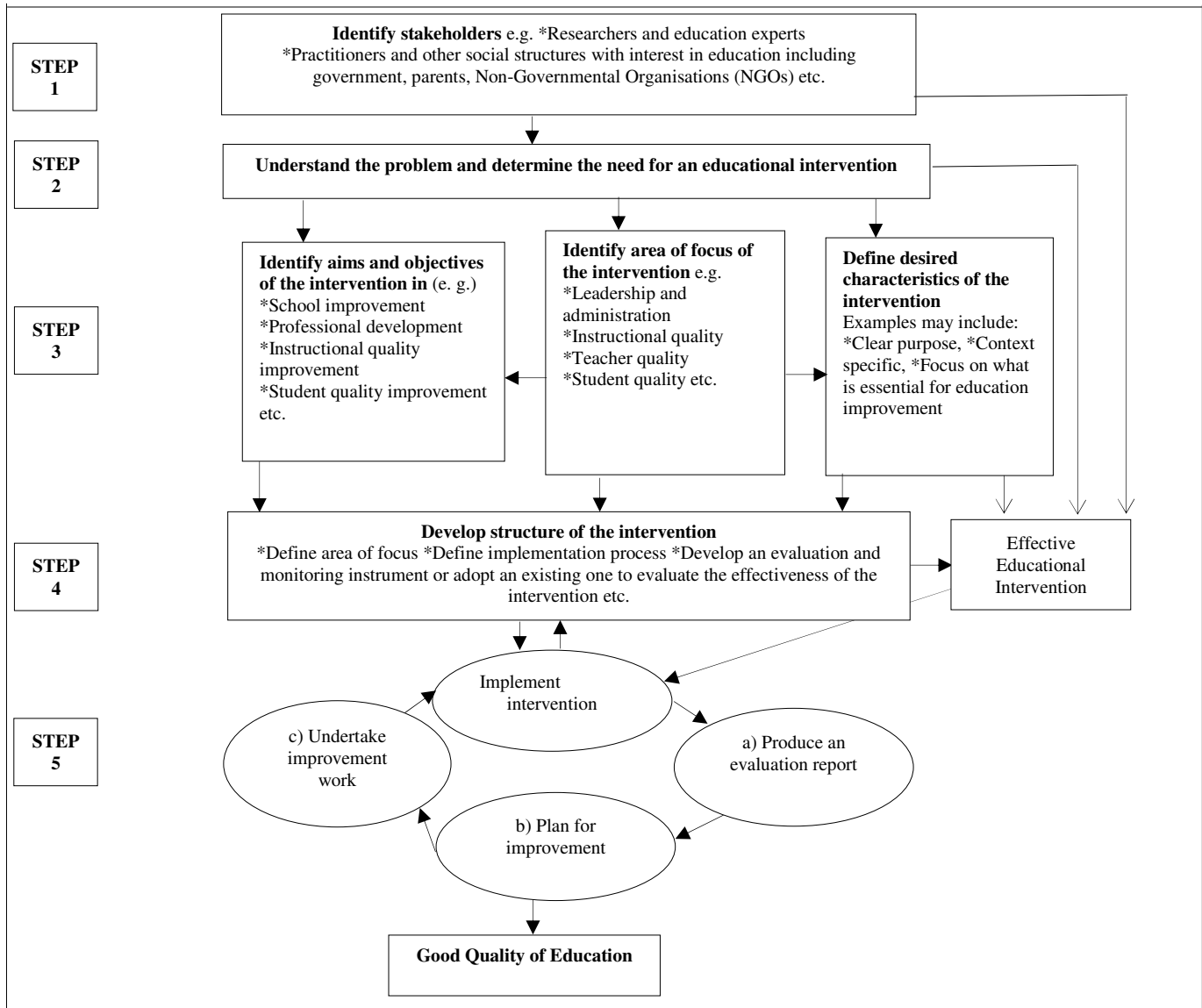


Figure 1: A process model for developing high quality educational interventions

4.1.1. Identify Stakeholders (Step One)

Our process model proposes that, when developing a high quality educational intervention, the starting point is to identify the relevant stakeholders who will be involved in its development process (see Figure 1, step 1). The principal assumption here in the development of educational interventions is that all stakeholders, irrespective of their roles, have the ability to reflect, learn, inform and work to improve the intervention (MacBeath, 2006). Typical examples of stakeholders here may include the government, school administrators, teachers, teacher associations, support staff, parents, experts, researchers and Non-Governmental Organisations involved in education policy and funding (see Figure 1, step 1). There should be a key person, usually a researcher, to coordinate the process. The researcher should have knowledge about educational practice and about design research skills. Researchers with knowledge about educational practice may be guided by excellent resources on design research such as Plomp and Nieveen, (2010); Van den Akker, Gravemeijer, McKenney and Nieveen, (2006); Nieveen (1999) among others in leading the process of developing educational interventions.

Stakeholder-participation at the onset of the development of educational interventions is crucial to ensure everyone's commitment towards the initiative. Moreover, if stakeholders are included in the development process of educational interventions, they may

provide support for the planned change, which is likely to increase the acceptability of the intervention (Plomp, 2009; Smith, 1997). Conversely, when educational interventions are developed in isolation from key stakeholders, issues related to their clarity, acceptance, and potential barriers to their implementation may not be addressed (MacBeath, 1999) which may affect their effectiveness. Therefore, the participation of various stakeholders in educational interventions' development process is essential in guiding the successful design, development, implementation and evaluation of the interventions. Stakeholder involvement has been recognised as a good practice in the evaluation processes of education (Quinn Patton, 1982).

There are some key issues to be considered when recruiting stakeholders who are to be involved in the development of educational interventions. Factors to consider for stakeholder recruitment may include their ability to invest their time in the process and also their willingness to communicate educational issues. Recruiting stakeholders in this way is essential in order to obtain valuable information regarding educational interventions' development and also the kinds of interventions which need to be developed in order to improve the quality of education. Those who will participate in the development of the intervention should be representative of a wide range of stakeholders in education who would be affected by its introduction. Getting a balanced composition of participants may be a challenge, for if the range is over-represented by one group of stakeholders, the variety of ideas may be limited. Hence, a wide range of stakeholders should be included in the process of developing educational interventions so that all their views may be well represented.

4.1.2. Understanding the Problem and Determining the Need for Educational Intervention Initiative (Step Two)

After identifying stakeholders, our process model acknowledges that the most important thing in the development of educational interventions is to determine the need for the intervention. This may be achieved through understanding the problem at one of the multi-levels of the education system. This is important in that this may guide the development of the intervention for the intended level of the education system. Unless there is a clear understanding of the problem, any attempts at solving it may be futile. So, before people embark on developing any educational intervention, there has to be a clear understanding of the problem in question by all the stakeholders. Only then can people chart the way forward in terms of how to solve the problem. Hence, there is a need for all stakeholders involved in the development of an intervention to understand that there is a problem in the education system which needs to be solved.

Having identified and understood the problem, stakeholders should then determine whether there is a need for an educational intervention initiative (see Figure 1, step 2). This step involves stakeholders to come to a consensus that there is indeed a problem and hence the need for an educational intervention. Research has shown that many educational interventions fail because some stakeholders, especially school practitioners, may not realise the need for the intervention and hence they may view it as an imposition on them (Smith, 1997) when asked to implement it. Stakeholders have to agree that there is a need for the intervention before efforts are made to design and develop it. The need for the educational intervention initiative may be determined at the national, provincial, district, school or at the classroom level. Wherever this need may be determined, all the relevant stakeholders should agree on the need for the intervention initiative as a viable way towards solving the identified problem (see Figure 1, step 2).

In determining the need for an educational intervention initiative, stakeholders should analyse the strengths and weaknesses in education and its provision. Issues to be considered and investigated may include:

- problems faced in education at the national, provincial, district, schools and classrooms by school administrators, teachers or by students and their consequences;
- factors which contribute to such problems;
- stakeholders' perceptions of these problems;
- additional information about these problems that is required in order to effectively understand them so as to find ways of solving them; and
- what can be done in order to overcome the problems

So, in determining the need for the intervention, stakeholders should first have a clear understanding of the problems at hand in order to come up with effective interventions which may help to solve the identified problems. Educational interventions will vary due to the uniqueness of each problem and the level at which it manifests itself in the education system.

4.1.3. Identifying Aims, Objectives and Characteristics of Educational Interventions (Step Three)

This step is a reflective stage which involves stakeholders to analyse the aims and objectives of the educational intervention they want to develop and to define the characteristics of the intervention they want in their own contexts (see Figure 1, step 3). Stakeholders' involvement in defining the aims and objectives and the characteristics of the interventions is a necessity for establishing a culture of shared values necessary to operationalise the intervention in its intended setting. A complete educational intervention should have certain characteristics which are essential in order to guide both its development and implementation. Classic examples of characteristics of high quality educational interventions which may be considered during the development process may include the following:

- The intervention should have a clear purpose;
- The intervention should be context specific; and
- The intervention should focus on a particular identified problem in order to improve quality of education

The aims and objectives of the intervention should be contextualised in order to efficiently address the challenges identified at a particular level of the education system (national, provincial, district, school or classroom). Stakeholders should reach consensus decisions on the aims, objectives and characteristics of the educational intervention (see Figure 1, step 3). Stakeholder-input on these

issues should be guided by the need for the intervention. The input of stakeholders should also reflect problems in education and the priority needs. Strong agreement on priorities is imperative for stakeholder-commitment to problem resolution since people are likely to be committed to something which they construct themselves than to the one they feel is being imposed on them (Smith, 1997). The identification of aims, objectives and characteristics of the intervention allows stakeholders to determine what they hope to accomplish through efforts to resolve the problem.

4.1.4. Develop the Structure of the Educational Intervention (Step Four)

Step four of the process model involves participants to be involved into action where they have to develop the structure of the intervention (see Figure 1 step 4). In developing the structure of the intervention, the following aspects should be included:

- i. aims and objectives of the intervention (obtained in step three);
- ii. a description of the process that should be carried out in implementing the intervention;
- iii. the specifications of the people responsible for implementing the intervention (training may be required to equip the implementers with the necessary knowledge and skills);
- iv. specification of an evaluation and monitoring instrument;
- v. a description of the format of an evaluation report; and
- vi. a format of an improvement plan

This structure is developed as a first prototype, a preliminary version of the intervention, and it should evolve as the various stakeholders are consulted through successive prototypes until the final product as detailed in Plomp and Nieveen, (2009). The stakeholders should define the area of focus of the intervention as well as its implementation process (see Figure 1, step 4). Stakeholders should be representative of the population if results are to be statistically generalised.

The improvement plan may target items (ii) and (iii) above, that is, if the intended outcomes are not realised after the implementation of the intervention. People should revert to the initial intervention to check whether it was a wrong implementation of an appropriate intervention or it was a correct implementation of an inappropriate intervention so that such problems may be rectified. But normally, the assumption is that the intervention should always be appropriate, especially if it is developed following the process model proposed here. The final stage in this step is to develop an evaluation instrument to be used to check the progress made in terms of how the intervention's goals have been realised (see Figure 1, step 4). Evaluating the intervention's success is essential so as to ascertain whether it meets the pre-determined stipulations. This may also result in the improvement of the quality of the intervention.

4.1.5. The Implementation Stage (Step Five)

After developing an intervention, it has to be implemented. In the context of this process model, the implementation stage should be part of the development process of the intervention in that it can inform further improvement of the initial intervention. Since this implementation process is continuous and cyclical (see Figure 1, step 5), the development of a high quality educational intervention should inevitably be a continuous process informed by new challenges at the implementation stage. Therefore, after the initial development of the intervention, those in charge of its development should continually seek to improve it and make it more systematic through evaluating it. This is in line with design research where developed educational interventions should be evaluated through both formative and semi-summative means as a way to improve the quality as well as to ascertain the effectiveness of the intervention (Nieveen, 2009). Therefore, during the implementation process, the implementation team may find that the intervention may need to be adjusted, and hence, may revert to the initial structure of the intervention and modify it (see Figure 1, step 5).

This action stage continues with developing a plan to ensure the target population's readiness for the intervention's role in addressing the identified problem. Key points to be considered here may include:

- goal-related outcomes that are expected from the introduction of the intervention;
- when these outcomes will be achieved;
- resources and supports required for the successful implementation of the intervention; and
- strategies required to minimise implementation barriers

Although it is often suggested that interventions may be more effective when implemented by the researchers than by the teachers (de Boer, Donker & van der Werf, 2014), some studies indicate that when teachers are able to develop an intervention, their implementation fidelity will be higher (Datnow & Castellano, 2000; Wehby, Maggin, Johnson, & Symons 2010). This implies that instead of just being involved in the implementation of educational interventions, teachers should also be involved in the development process of the interventions. This is in line with design research which recommends for a partnership among researchers, practitioners and other stakeholders in education in the design and development of educational interventions (Plomp, 2009).

After the implementation process, the findings should be reported to the intended audience in form of an evaluation report. The evaluation report should address the aims of the intervention identified at the outset of the development process or those which may have emerged during the implementation process.

The evaluation report should record:

- the intervention area chosen;
- findings from the implementation process;
- a summary of strengths; and
- a summary of areas requiring improvement

Those implementing the intervention should be able to draw up an improvement plan based on the evaluation report. Priority for improvement should be based on those areas where some weaknesses were found. For improvement in the identified area to be

effective, all stakeholders' views on how improvement may be realised should be considered. The improvement plan should reflect what needs to be achieved taking into account the results of the evaluation report. Such planning is essential for effective improvement purposes. In developing an improvement plan, the following points may be considered:

- a summary of the areas that require improvement identified during the implementation of the intervention;
- targets for improvement;
- reference to those who are responsible for undertaking actions;
- a statement of how those responsible will check whether improvement has been achieved; and
- a timeframe for achievement of the targets

After producing an improvement plan, it should be implemented. This involves looking closely at areas identified as requiring improvement during the evaluation process and the targeted areas for improvement from the improvement plan (see Figure 1, step 5). After planning for improvement, responsible people should be engaged in a process of improving those areas that were found to be weak during the implementation of the intervention. Since intervention implementation is not an end but a continuous process (see Figure 1, step 5), the target settings should use information obtained to ensure a regular cyclical process of implementing the intervention, producing an evaluation report, planning for improvement and undertaking improvement work (see Figure 1, step 5). This is important in order to enhance quality of education in schools. A critical issue to be understood with educational interventions is the recognition that full implementation of the interventions in order to realise the desired outcomes takes time. Therefore, movement through the implementation stages (see Figure 1, step 5) is dependent upon performance implementation and communication among all stakeholders to ensure that supports and necessary resources are provided.

Despite being applicable to the Zimbabwean context for which it was developed, the process model for developing educational interventions may also be used in other countries to develop educational interventions for their education systems. While some developing countries may have educational interventions, others may have problems in developing them considering the complexity of developing educational interventions (Plomp, 2009). Moreover, the challenges which education systems face are not static and are not necessarily the same. Therefore, an intervention that was developed and implemented for a certain educational problem may not work for other educational problems. Hence, there is a need to have a process model for developing educational interventions to address educational challenges as they present themselves. The process model may guide the development of appropriate educational interventions for developing countries which do not have such interventions for their education systems. Therefore, this process model can be innovatively applied to other countries in developing educational interventions.

5. Conclusion

This paper's main innovation is the development of a process model for developing high quality educational interventions. Design research approach was used to help in understanding the characteristics of high quality educational interventions as well as in developing the process model. A process model for developing high quality educational interventions is, indeed, essential as it may help to enhance an understanding of what is involved in the development and implementation of high quality educational interventions. The process model presented in this paper provides a general process which can be used by various education systems, especially in some developing countries to develop educational interventions in order to solve various educational problems. The paper acknowledges the importance of early identification of educational problems at the multi-levels of the education system so that targeted systematic interventions may be provided as soon as a need is recognised. Taking into account the differences in perspectives of the various education systems, the aim is to set out a globally applicable process model for developing high quality educational interventions that can be used to suit the local contexts of the different education systems. Whilst the process model proposed here has primary focus on the school, it is general enough and is applicable as a process model for developing educational interventions for the various levels of the education system (pre-school, school, tertiary and national). It is hoped that most education systems in developing countries may, therefore, design and develop various educational interventions to improve the quality of education based on the proposed process model presented in this paper.

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