Curriculum Construction and Implementation

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Abstract

Curriculum construction, design and implementation is a continuous process influenced by curriculum evaluation which enables on-going improvements to curriculum design and application. It relies on relationships and organization and these features capture the human element of the process recognising it is an organizational and decision-making process that ultimately informs the development process.

Curriculum design and implementation is a change process and change is hard to conceive and harder to implement. It requires the support and leadership within schools from subject leaders, vice-principles and principles and at higher levels. The belief and attitudes of supervisors to support changes and curriculum reform is essential and as is the channeling of support to teachers. Interrelated to the support teachers need is in-service professional development programs and (possibly) additional resources are required to ensure the curriculum implementation process is successful.

Key Words: Curriculum, Construction, Implementation, Evaluation, Design, Development

1. Introduction

This paper aims to provide educationalists with an overview of the curriculum construction and implementation processes and cumulates with and framework which can be accepted (used for implementation), rejected, adapted or shelved for future use by (aspiring) curriculum designers. The article does not seek to prescribe what the author deems to be the best element of the processes but rather provide an outline and understanding of what the curriculum construction and implementation processes are.

The paper begins with looking at what curriculum designis; incorporating both identifying the main the elements of curriculum design and the types of curriculum design. The section that follows outlines and explains the alternative curriculum design processes. The paper goes onto to discuss curriculum implementation process and the importance of and how curriculum evaluation is relevant to the various stages in the curriculum construction and implementation processes.

2. Curriculum Design

According to Taba (1962):

Curriculum design is a statement which identifies the elements of the curriculum, states what their relationships are to each other, and indicates the principals of organization and the requirements of that organization for the administrative conditions for which it is to operate. A design of course needs to be supported with and to make explicit a curriculum theory which establishes the sources to consider and the principals to apply (p. 421).

The key word in Taba's (1962) statement of in reference to curriculum design is organization, and I would suggest that this reference to organization captures the human nature of this process recognising it is an organizational and decision-making process that ultimately informs the development process. Design focuses on what is decided to be learned, how it is to be learned and why it is to be learned. This is evidenced in the New Zealand Curriculum (2007):

Curriculum design and review is a continuous, cyclic process. It involves making decisions about how to give effect to the national curriculum in ways that best address the particular needs, interests, and circumstances of the school's students and community (para. 3).

Ornstein and Hunkins (2009) broaden curriculum design to include the imparting of essential concepts, attitudes, and skills to learners. So not only does the design of the curriculum take into account the development of intellect but also character development and the link to curriculum design in turn is linked to selected philosophy (ies) of curriculum, which, again, are often privileged by those involved in the design and development process.

2.1 Main Elements of Curriculum Design

Ornstein and Hunkins (2009) identify two main elements of curriculum design; the source of the design, that is, what sources informs curriculum design and the second element of curriculum design actual method or technicalities influencing the design process, sometimes referred to as the horizontal and vertical organizational influence. The source of the curriculum design can derive from a variety of influential foundations including social imperatives, moral doctrine, knowledge and the learner (Ornstein &Hunkins, 2009). The sources can overlap when designing curriculum and incorporate both traditional and contemporary philosophies. Society as a source draws on ideas from social, economic and political contexts and motivations. There is a focus on addressing the needs of current and future societies. Knowledge as a source prioritizes what knowledge has the most value and the knowledge that should be transferred to society as a whole. What knowledge fundamentally is important to society is identified and influences the design process. Complementing knowledge as a source of curriculum design is the learner as a source which focuses on the needs of the student and how students learn and develop attitudes, values, interest and character. This consideration implies a student centered teaching and learning approach is necessary in informing curriculum design.

The second element of curriculum design is the horizontal and vertical organization of curriculum. Vertical organization ensures sequence and continuity within the curriculum. It refers to the vertical arrangement of content as reflected in the presence of sequence, continuity, and vertical articulation or integration in the curriculum (Ornstein & Hunkins, 2009). The sequence is the ordering of content (including skills and processes) over time which could be by week or by year which ensures continuity. Horizontal organization is primarily focused on the scope which is the breadth and depth (Tyler, 1949) of material to be covered. Within the scope are; topics, themes, concepts, principles, theories, and pedagogical approaches. Teaching and learning outcomes as well as skills and competencies are also included in the

scope.   Additionally horizontal organization is concerned with side by side relationships or integration of different areas of curriculum. For example in a reading class a social studies topic maybe covered.

The other important components of curriculum design are alignment and coherence where all parts of the curriculum must be logically consistent with each other. There must be a match between all parts or as Ornstein and Hunkins (2009) describe it, as a balance where the skills, attitudes and knowledge are aligned with philosophies. The balance should give appropriate weight to each component of the design (Ornstein & Hunkins, 2009).

2.2 Types of Curriculum Designs

Ornstein and Hunkins (2009) and Sowell (2005) identify three main types of curriculum designs; subject centered, learner centered, and society centered.   Subject centered curriculum designs reflect a mental discipline approach to learning and assumes the subjects are best outlined in textbooks. Recognized as a traditional design this is reflected in the educational philosophy of; essentialism and the subjects most commonly compromise this curriculum design approach; these being, English, arithmetic, science, history and foreign languages (Ornstein et al., 2011).

Subject centered curriculum designs can be grouped into interdisciplinary design, correlation design and process design, all of which provide the blend or weave into the horizontal and vertical organization of curriculum. The fourth subject centered curriculum design is discipline design where curriculum should be organized according to the structure of the discipline (Bruner, 1961).

The second major type of curriculum design is the learner-centered design. It designs the curriculum around "students' lives, needs, and interests" (Ornstein & Hunkins, 2009, p. 197) and incorporates; the child centered design, experience centered design, radical design and the humanistic design. It advocates the involvement of the students in the design of the curriculum based on a child's needs. Dewey in his work believed that students' interests should be taken into account when planning a curriculum these interests should not determine what the curriculum contains.

The third type of curriculum design is problem centered or society centered which engages students in the needs of society and seeks to critically analyze local, national and international communities; religious, political and business practices and the economic needs and outcomes from these practices.

An application of these design features is evident in recent developments internationally. For example, Finland (Garner, 2015) "is about to embark on one of the most radical education reform programs ever undertaken by a nation state – scrapping traditional teaching by subject in favour of teaching by topic" (para. 3). The rationale behind this is to prepare students for the world today and the future. The curriculum will have both horizontal (more so) and vertical integration and by implication will incorporate elements of a society centered curriculum.

The Finnish curriculum will embrace progressive teaching and learning philosophies; so, in essence the philosophies have been pinpointed before the other aspects of the curriculum have been decided upon, such as content, vertical and horizontal organization and the sources. As stated earlier, Tyler (1949) and Dewey (1938) both identify the importance of setting the philosophical and psychological foundations of curriculum prior to the designing of the curriculum.

3. Curriculum Development (Process)

Curriculum development can be seen as a process or a series of steps to create a whole curriculum. This whole curriculum is an ongoing process and a live document that needs to be constantly up-dated and reviewed. Salberg (2006) supports this notion and sees curriculum development as:

An ongoing process and not just a product. Further, curriculum development can no longer be viewed as a project that has a start and an end. In today's rapidly changing world, the curriculum designed today and implemented in the years to come could still be responsive and relevant in five years conceptually but specific facts may not be so. Curriculum should be viewed as a living, organic instrument to help teachers and schools to find optimal ways to educate students (p. 8).

The Education Resources Information Center (ERIC) (n.d.) recognizes that curriculum is typically in a state of continuous revision as it is responsive to the theories and the emerging needs of society. This is emphasized by Braslavsky (n.d.) who supports the notion of the curriculum development as anongoing process. The development process typically draws upon several stages, each of which is influenced by the views of those involved. An example of such a process is described as a four phase approach to curriculum development taking the following shape as discussed in Braslavsky (n.d.):

(1) What the society or the parents want;
(2) Responses provided by teachers in the schools;
(3) The collection of these responses and the effort to identify some common aspects; and
(4) The development of common standards and their evaluation (p. 3).

Marsh and Willis' (2007) recognize different levels within curriculum development; national, state, provincial, school and classroom, each of which pertains to this study. At the national level, it is important to note that different people make up the curriculum development boards at each level and more than one level can be tasked with the curriculum development process creating a networked curriculum development process.   The make-up of the curriculum development team depends on whether the curriculum development process is generic; high level or site-specific. For example, at a site specific level "a principal, an assistant principal for curriculum, a team leader, a department head, or by leading classroom teachers" (Wiles 2008, p. 2).In essence curriculum development produces the product element in the process.

3.1 Types of Curriculum Development Approaches

Marsh and Willis (2007) imply that prior to the commencement of the curriculum production process curriculum teams should first identify their beliefs, values, and assumptions. This will help eliminate or reduce tensions during the curriculum production process. The composition of the curriculum production team can determine the type of curriculum development approach adopted. Some curriculum developers focus on students and their learning goals whereas others focus on the influence of the teacher's actions on the teaching and learning process with Taba (1962) taking into consideration both the students and teachers. Others focus on the context of teaching and learning and the extent to which individuals are viewed independently or as the objects upon which the work of curriculum is used (Ornstein & Hunkins, 2009).

Ornstein and Hunkins (2009) illustrate two approaches to curriculum development; the technical-scientific approach and the nontechnical-non-scientific. Ornstein and Hunkins (2009) see curriculum development as the humanistic, artistic and technical processes that allow schools and their associated stakeholders to achieve their educational goals. The attainment of the educational goals can be accomplished using "the technical-scientific and/or the nontechnical-non-scientific approach (es) to curriculum development" (Ornstein &Hunkins, 2009, p. 246).

3.1.1 Technical-scientific

The technical-scientific approach to curriculum development stresses "students learning specific subject matter with specific outputs" (Ornstein & Hunkins, 2009, p. 212). The focus is on knowledge acquisition and what knowledge is most important for the students to gain. The curriculum is structured in a

step by step manner to optimize students' learning and to allow them to increase their output. Neary (2003) describes the technical-scientific model as the product model which emphasises plans and intentions. It is very teacher centric and focuses on content structured assessment tools. Two of the early leading proponents of the technical-scientific approach to curriculum development were Ralph Tyler and Hilda Taba.

Tyler (Walker &Stoltis, 2004) suggests that curriculum development process revolves around four questions:

(1) What educational purposes should the school seek to attain?

(2) What educational experiences can be provided that are likely to attain these purposes?

(3) How can these educational experiences be effectively organized?

(4) How can we determine whether these purposes are being attained?

Questions 1 and 2 are aims and objectives and influence what content should be included. This could be described as an architectural framework which Dolence (2003) refers to as the curriculum framework. Tyler's (1949) framework defines the objectives, the content, the method, the sequence and how much scope. It can be seen to be a top-down approach.

While Tyler's (1949) approach implies a top-down approach and is subject centered output focused with little concernin student participation Taba's (1962) promoted a technical-scientific approach that had more teacher involvement in developing the curriculum and also took into account the needs of the students. Taba(1962) created a seven step process to provide a specific procedures and planning for curriculum development (Ferris &Hedgcock, 2013):

(1)What are the needs of the students?

(2) Creation of objectives;

(3) Content is developed based on the objectives;

(4) The content is organized taking into account the needs of the students;

(5) The instructional methods are selected to encourage student participation;

(6) Learning activities are prepared;

(7) Evaluation tools.

The technical-scientific approaches to curriculum design are still popular today but they do have its detractors who claim they are too linear in their approach (particularly those designs based solely on Tyler's approach) and hence the development and design of the curriculum.

Hussey and Smith (2003) suggest the following:

Accepting that student motivation is an essential element in learning, we propose that those who teach should begin to reclaim learning outcomes and begin to frame them more broadly and flexibly, to allow for demonstrations and expressions of appreciation, enjoyment and even pleasure, in the full knowledge that such outcomes pose problems for assessment (p. 367).

Wiggins and McTighe (2005) technical-scientific backwards design approach has sought to address Hussey and Smith's (2013) contention that the approach takes into account how students willlearn what the school wants them to learn through a three stage (Wiggins and McTighe, 2005) backwards design approach:

(1) What are the goals; that is, what are the preferred student knowledge, skills, values, attitudes?

(2) How will the curriculum be evaluated and what evidence will be collected to assess the curriculum?

(3) What content should be taught and how should it be taught? What skills and knowledge do students need to succeed and what activities will facilitate the acquisition of the identified skills and knowledge? What teaching and learning materials will contribute to students' success?

If a technical-scientific approach is the preferred curriculum development approach the amount of student teaching and learning material and activities in use is dependent on the make-up of the curriculum development team. A second variable is the existing syllabi, resources, or practices (Marsh & Willis, 2007). It must be noted these two points are applicable to the nontechnical-nonscientific approach to curriculum development.

3.1.2 Nontechnical-nonscientific

Whereas the technical-scientific approach to curriculum development is very subject and content centred the nontechnical-nonscientific approach to curriculum development is student centred with the emphasis on the learners rather than the outputs (Ornstein &Hunkins, 2009). By its very nature, it employs contemporary educational philosophies and has a holistic view of learning. It takes the view that the formal assessments do not measure the accomplishments of curriculum. Ornstein and Hunkins, (2009) describe the nontechnical-nonscientific approach to curriculum development as being, "highly objective, universal, logical, subjective, personal, aesthetic, heuristic, and transactional" (p. 220). Ornstein and Hunkins (2009) go onto to say "not all the educational goals can be known and the curriculum should evolve rather than be precisely planned" (p. 220). It emphasizes an active rather than passive approach to learning. Neary (2003) describes the nontechnical-nonscientific approach to curriculum development as a process model that concentrates on activities and the effects of the activities. There is also a weighting on student choice and life and social skills.

Both the technical-scientific approach to curriculum development and the nontechnical-nonscientific approach to curriculum development have a number of different models (Ornstein &Hunkins, 2009). The choice of which approach and/or combination depends on the context and which is also influenced by the stakeholders and curriculum developers and designers.

4. Curriculum Implementation

Referring to Ornstein and Hunkins' (2009) identification of curriculum as a production the process of implementation can be seen as applying the product that has been created in classrooms and schools. Both Tyler (1949) and Taba (1962) see curriculum implementation as the final destination for curriculum; that is in the classroom.

The implementation of a new or revised curriculum needs to ensure that all stakeholders are informed (and in the cases of schools and teachers they need to be provided with guidelines) and communication is proactive. Professional learning communities can provide forums for discussion, support, feedback and advice. Resources need to be in place and in-service professional development training needs to be provided to teachers and all associated staff that need expertise in both a new, revised or re-energized curriculum and the supporting teaching and learning tools and resources in its implementation.

Marsh and Willis (2007) recognize that there are challenges around curriculum implementation including finding times for those charged with the implementation which is essential for success, the lack of uniformity that arises from the fact that enactment can vary from school to school and that there is no one right way of going about it for all teachers in all schools. Of particular emphasis is that curriculum implementation is a change process which can be fraught by a variety of factors which can affect the implementation process. Fullan and Pomfret (1977) suggest "effective implementation of innovations requires time, personal interaction and contacts, in-service training and other forms of people-based support" (p. 391). The people-based support suggested by Fullan and Pomfret (1977) can minimize the effects of anxiety and often identified resistance to change. Substantive in-service teacher training is usually necessary as it provides the support necessary for the change associated with instruction or delivery (the method the

learning will be achieved) of the curriculum which ultimately influences the received curriculum is. However, training without follow-up, support for teachers and subsequent training sessions will not deliver significant results (Killion & Kaylor, 1991).

Fullan(2007) suggested there are three elements to the curriculum implementation process; using new resources and curriculums, employing new practices and integrating new principles and attitudes. Changes in teachers beliefs, attitudes and principles need to precede the introduction of new resources and practices as the change in teacher beliefs and attitudes is likely to take after they see evidence of changes in student learning as a result and the new materials and practices (Guskey, 1986). Fullan's(2007) work has increasingly drawn attention to the influence of belief systems on curriculum implementation, recognizing, as Pinar et al (2005) assert that at the classroom level teachers reconceptualise curriculum based upon their own system of beliefs and ideals.

Once the implementation process has commenced the success of the implementation not only relies on the in-service teacher training and change in believes and practices but the ongoing support of the implementation process (Fullan & Stiegelbauer, 1991) and clarity of the change process with clear and specific details provided to teachers (Fullan, 2007). Change is hard to conceive and harder to implement (Fullan, 2007) and requires the support and leadership within schools from subject leaders, vice-principles and principles and at higher levels such as directorates and within the Ministry of Education (Fullan, 2007). Thee belief and attitudes of supervisors to support changes and curriculum reform is essential and channeling this to teachers (who will need the support of principals and school leaders) with support and training is going to be essential for success.

5. Curriculum Evaluation

Curriculum evaluation is the fourth element in the curriculum production process (Ornstein & Hunkins, 2009).   Oliva's (1997) curriculum evaluation has four elements; curriculum goals, curriculum objectives, organization and implementation of the curriculum, and finally the evaluation of the curriculum. According to Oliva (1997), the primary purpose of curriculum evaluation is to determine whether the curriculum goals and objectives are being successfully carried out or not. If the goals or objectives of the curriculum do not include student achievement then student results should not be used to measure the effectiveness or success of a curriculum (Oliva, 1997).

Hamilton (1977) associates the work of Bobbit(1918), Tyler (1949) and Dewey (1939) with the emergence of curriculum evaluation with the evaluation focus being on educational outcomes and if students were meeting them. This approach has continued today with scientific, quantitative approaches are often employed in the evaluation of curriculum. Malik (2010) has suggested one of the reasons for this is the international use ofinternational testing assessments such as The Program for International Student Assessment (PISA) and The Trends in International Mathematics and Science Study (TIMMSS). Some countries such as Finland and New Zealand have mathematics curriculums compatible with PISA (Loveless, 2013). Tienken (2013) suggests that PISA and TIMMSS tests results do not provide an assessment of the quality of public education in the United States due to the sample of the student population tested in the United States in comparison to other countries.

In contrast, Gubaand Lincoln (1981) take a more naturalistic approach to curriculum evaluation identifying it as a combination of two concepts; merit and worth. Merit is looked upon as not being linked to a context but rather the value of an entity whereas worth is connected to context. For example a country sees great merit in having its citizens having the ability to communicate in English and the citizens who work or study in an international environment see and benefit the worth from having English skills. However,

students in rural areas may not see the worth. Therefore, Gubaand Lincoln (1981) contend that curriculum should be evaluated on both merit and worth.

Sage Publications, (n.d., p. 357) have suggested that curriculum evaluation is an attempt to toss light on two questions; first, Do planned courses, programs, activities, and learning opportunities as developed and organized actually produce desired results?; and How can the curriculum offerings best be improved?

Salberg (2006) notes the curriculum development process which curriculum evaluation is an integral part of is on-going, that is it is not a one off event. It can be seen as providing an ongoing needs analysis function. Curriculum evaluation is a tool for examining or determining the appropriateness of the selected curriculum (and received curriculum) for the students; How much of the curriculum in use is the target audience actually receiving?;Are the pedagogical approaches selected complementing the curriculum objectives?; Is the content meeting curriculum goals? and, Are the teaching and learning tools and/or materials appropriate?

Scriven (1967) identified two main types of curriculum evaluation. The first is formative which begins during the curriculum development stage so as curriculum is being planned it is simultaneously being evaluated and is concerned with the questions posed in the previous two paragraphs. By its very name it is implied that formative evaluation is an ongoing process which links it to the ongoing nature of the curriculum development process. Summative curriculum evaluation is the second type of curriculum evaluation Scriven (1967) identified and occurs after the curriculum has been implemented to measure or evaluate it against the curriculum objectives.

Some popular curriculum evaluation models include; Bradley's (1985) Effectiveness Model, Tyler's (1949) Objectives-Centered Model, Stufflebeam's(1971) Context, Input, Process, Product Model, Scriven's(1972) Goal-Free Model, Stake's (1975) Responsive Model and Eisner's (1985) Connoisseurship Model.

6. Summary

The paper provides an understanding of curriculum design and the main elements of curriculum design, including the explanations on the types of design. This was followed by an overview of curriculum development and the types of curriculum development approaches. The third section of the article provided an explanation of curriculum implementation and more importantly the factors that contribute to successful curriculum implementation. The final section of the paper and fourth element in the curriculum production process, curriculum evaluation is explained along with the types of curriculum evaluation. Figure1 (Relationships Between the Curriculum Production Process (and its four elements; design, development, implementation and evaluation), the Foundations of Curriculum, the Orientations to Curriculum, Curriculum Design and the Curriculum Development Approach)below concludes the article and links the curriculum production process (and its four elements) with the foundations of curriculum, orientations to curriculum, curriculum design, curriculum development approach, curriculum implementation and curriculum evaluation. In essence Figure 1 providesa summary and an overview of the ongoing curriculum (construction) process.
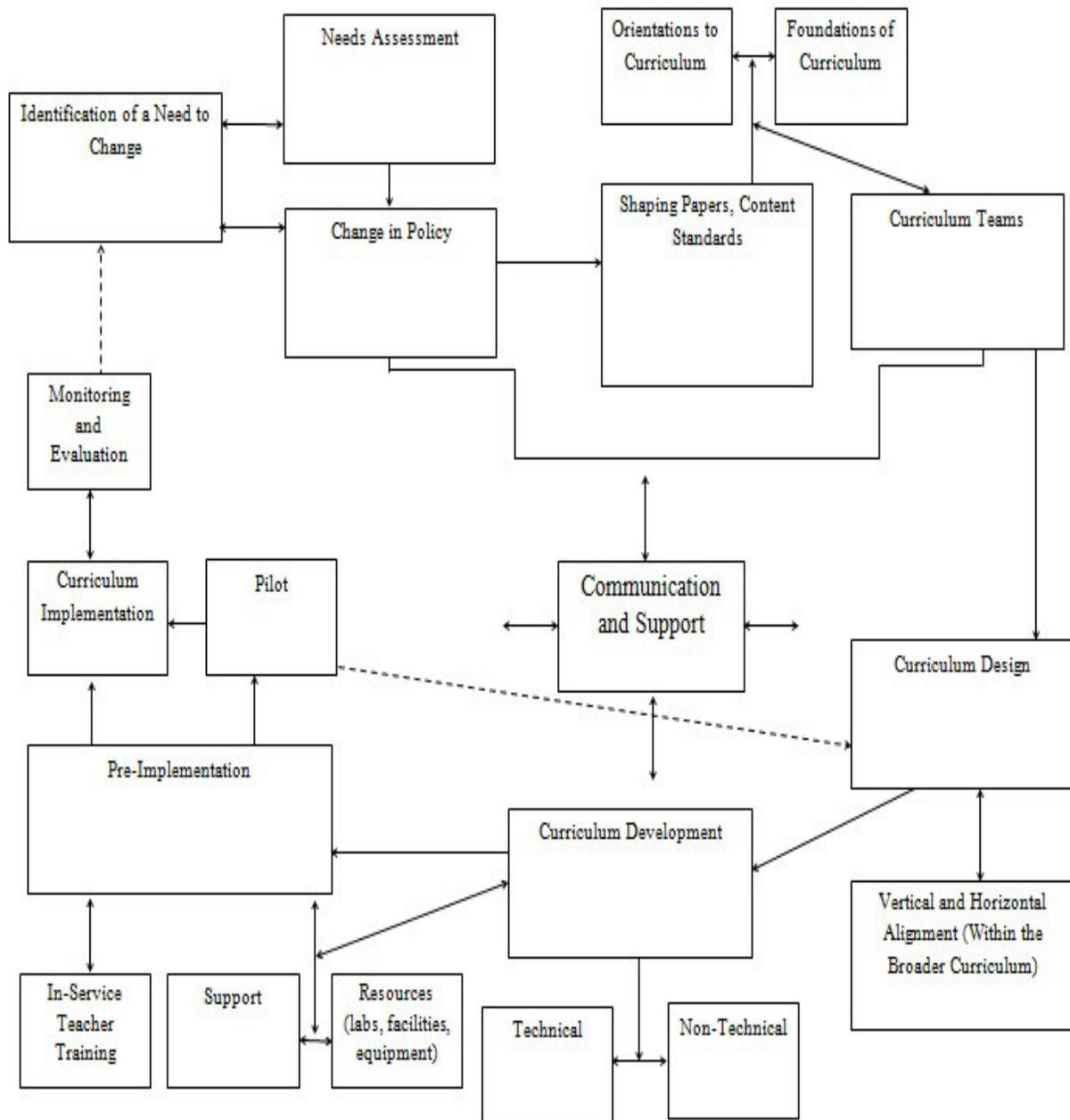
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