

## CONCEPT MAPPING AS A TOOL FOR CURRICULUM DESIGN: STRATEGY FOR INTERNATIONALIZATION OF EDUCATION

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### **Abstract**

Concept mapping has been internationally recognized as a tool for teaching and learning in different disciplines. Its effectiveness in teaching and learning has been ascertained by many researchers. These researchers include; Novak and Gowin (1984), Novak (1990), Novak (1991), Okebukola (1990), Asiyal (2005), Duru (2006) etc. They carried out these studies in their respective disciplines. These studies revealed that concept mapping as teaching and learning strategies enhanced meaningful learning. Other researchers such as Mc Daniel, Roth and Miller (2000) reported that concept mapping is an effective tool for developing curricula, course descriptions and assessment of what a faculty can offer. The author of this paper applied the knowledge of concept mapping in the course description of curriculum theory and practice for the post graduate programme in tertiary institution. Using concept mapping in designing post graduate curriculum strictly ensures that the curriculum remains current within the intended learning outcomes and competences articulated by the institution, the specialized accrediting agencies, e.g. NUC and professional association e.g. CON. The author therefore examined concept mapping, its benefits in teaching and learning and curriculum designing. The author finally mapped curriculum concepts or course descriptions of the course titled “curriculum theory and practice” for M.Ed and Ph.D programs in faculty of education. Expected learning outcomes and instructional approaches are adequately represented in the map. The author believes that using concept mapping in designing curriculum is a step towards internationalization of education.

Concept mapping has been acknowledged as a tool for facilitating meaningful learning as well as a tool for developing curriculum as noted by researchers. Its use in the field of education progressed from a tool for knowledge representation to a tool for designing curriculum. For example Edmonson (1995) used concept mapping to develop a problem-based veterinary curriculum. She noted that using concept mapping principles for designing curriculum resulted in course content being more accessible and easily integrated by students.

MC Daniel, Roth and Miller also used concept mapping as a tool for designing and maintaining academic programs that meet articulated competencies leading to certification, accreditation and stakeholder interest at the National Defense University’s Information Resource Management College. Applying concept mapping principles in designing curriculum requires that the concepts will be mapped along the specific competencies, to give students, administrators and the faculty a better understanding of main ideas and how the concepts are integrated. Using concept mapping to design curriculum is so apt in this period that there is the urge to internationalize higher education. This will enable the faculty to sell its standard to the world. Internationalization of higher education in theory is a way of broadening the academic experiences of the students and academic staff. According to on-line dictionary, internationalization of higher education is the process of

integrating an international, inter-cultural or global dimension into the purpose, function or delivery of post secondary education.

Internationalization of higher education in practice is the process of commercializing research at post-secondary education and international competition for the recruitment of foreign students from healthy and privileged countries in order to generate revenue, secure national profile and build international reputation. The main components of internationalization of higher education are global competition for talents, recruitment of international branch campuses, students; staff and scholars, exchange programs, internationalization of the curriculum and education partnership between institutions regionally and internationally. This is where the mapping of curriculum drives and propels internationalization of higher education. The use of concept map in designing curriculum affords universities at international level to access programs run by other universities. This gives opportunity for comparison and integration of such courses into their own program across the country. Designing curriculum with concept mapping is one of the proven strategies that can promote internationalization of higher education (Edmondson 1995). The author of this paper designed curricular courses for M.Ed and Ph.D programs using concept map. The course is a core course and compulsory for all students. It is titled “curriculum theory and practice”. The learning outcomes and instructional approaches are well integrated in the concept map. In so doing, the required competencies and knowledge are globally presented as what the concerned university has for such courses at international level.

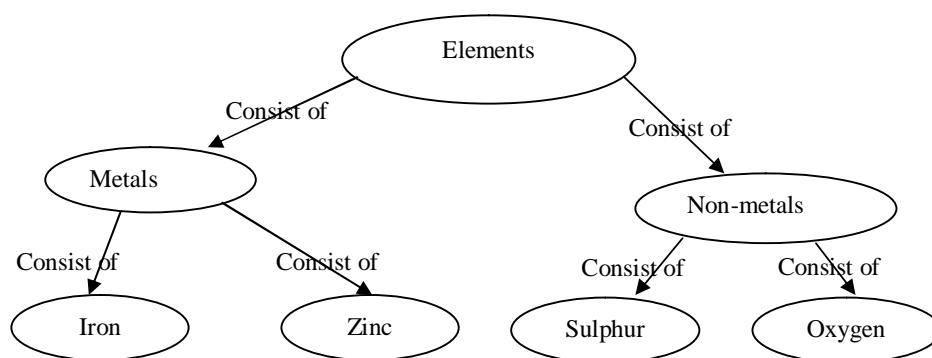
### **Conceptual Clarifications**

Curriculum is a process of achieving educational goals and objectives. The issue of inseparability of curriculum from education cannot be overemphasized (Duru 2016). It has been universally acknowledged that education is a means of achieving societal goals and objectives based on the people’s aspiration, needs and problems. Curriculum is therefore a process of achieving these lofty objectives. The program of education presents such questions as what should be taught? Who will be taught? How will it be taught and where will it be taught?. Also the issue of the materials to be used, are part of this program. The actualization of this program is referred to as “Curriculum” Krug (1957) defines curriculum “as that which consists of all the means of instruction used by the school to provide opportunities for students’ learning experience leading to the desired learning outcomes”. Taba (1962) defines curriculum “as that which consists of all learning experiences offered to the learners under the auspices of the school whether planned or not. This is more comprehensive since it includes all activities planned and unplanned under the guidance of the school.

Curriculum can be designed for specific levels of educational programs such as primary, secondary and tertiary levels to help both the learners, the administrators and the teachers be aware of their involvement and requirement in the program. In designing, there is need, to specify the contents (concepts) the skills, competencies and values of what to be offered to the learners. The curriculum is expected to show the procedures of evaluating students’ achievement and learning outcomes. These expectations make the designing of curriculum a complex exercise. Concept mapping therefore stands in the gap for clearly and specifically representing the course descriptions.

Mc Daniel, Roth and Miller (2000) reported that concept mapping of course description is a way to ensure that the faculty is addressing and validating competencies as well as integrating them across the departments and certificates of faculty of education and also across the university and the country.

Concept mapping is a teaching strategy in which maps or graphs are used to represent the relationship between main concepts and sub-concepts in subject disciplines (Duru, 2006). Lines are drawn from the main concept to the sub-concepts with arrow which is labeled describing the relationship between the two. The labeled lines are called propositions and the sub- concepts usually enclosed in circles or squares called modes. Concept maps are either in a hierarchical order or in networking order (Novak and Gowin 1984). However, the most commonly used is the one that flows down hierarchically from the main concept with more complex and super-ordinate concepts at the apex while more simpler and concrete concepts are downward see example. Okebukola (2002) stated that concept map is similar to outline but goes beyond the typical outline in that concept map shows relationships between concepts including bi-directional relationship.



**Figure 1: Concept Map Showing Classification of Elements with Examples**

Concept mapping as teaching strategy was first developed by J.D. Novak of Cornell University in 1977 (Duru, 2006). Concept map was derived from Ausubel's learning theory, which places central emphasis on the influence of students prior knowledge on subsequent meaningful learning. It is also based on the fact that the most single factor influencing learning is what the learner already knows. Ausubel posits that meaningful learning occurs or results when a person consciously and explicitly ties new knowledge to the relevant concepts they already possess.

When meaningful learning occurs it produces a series of changes within the entire cognitive structure, modifying existing concepts and forming new linkages between concepts. This is why meaningful learning is lasting and powerful whereas rote learning is easily forgotten and not easily applied in new learning or problem-solving situations (Ausubel 1978 cited by Duru 2016). Effectiveness of concept mapping as a teaching strategy has been acknowledged by many researchers, for example, Novak and Gowin (1984) used concept mapping to teach molecules in chemistry. Canas and Ford (1995) used concept map to form quorum project thus supporting collaborative learning across classroom and countries.

Collaborative learning is an enterprise in which the learners and perhaps their teachers co-operatively build an explicitly knowledge model which gives coherent expression to their understanding (Duru, 2006). Okebukola (1990) used concept mapping to teach genetics and ecology



Figure I is concept map of a curriculum course titled “curriculum theory and practice” for masters degree program in education (M.Ed). Based on the National University commission mandate, the M.Ed program has the mapped concepts or topics to cover. The course is a general course for all education students at masters level and is treated in a semester. The students have to review the various concepts of curriculum, discuss Curriculum Planning Process (CPP), enumerate and discuss factors that affect curriculum planning or decision making. The students are expected to have understanding of determination of objectives, contents, selection and organization of learning activities with special reference to Nigeria context. The students are to make analysis of various models of curriculum planning and development, they are required to discuss pedagogical approaches to education (teaching and learning), discuss simulation/games in curriculum approaches, understand its benefits or the need in teaching and learning.

Students are also required to analyze theoretical dimensions in curriculum practice (matching what is taught with theories) students are required to have understanding of curriculum implementation process (preparing to teach). Students are expected to have good understanding of hidden curriculum and its place in curriculum implementation; they are also required to examine centrality of the teacher in curriculum planning, development and implementation. They are to discuss emerging global issues in curriculum, and finally discuss evaluation or appraisal of curriculum innovation. The suggested instructional approaches are integrated in the map; which include collaborative approach, problem-solving, flexible grouping techniques, team teaching and co-planning. Students are to prepare topics assigned to them and do paper presentation using power points.

The expected learning outcomes are adequately integrated, students should be trained to acquire skills necessary to develop, justify, evaluate and modify curricula to better serve the needs of students in different contexts. They should be trained to be master teachers, scholars, researchers, curriculum co-ordinators in schools, and also curriculum planners and developers, working with government or in governmental establishment related to education. At the end of the course, there will be examination to assess students’ achievement in the course.

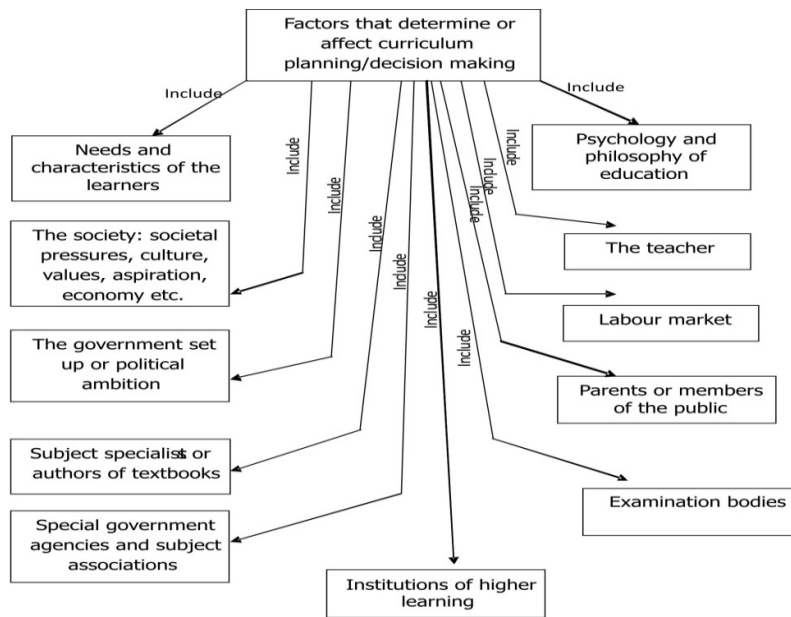


Figure 3: Concept Map illustrating Integration of Learning Issues Related to One of the Concepts for the M.Ed Curriculum Theory and Practice.

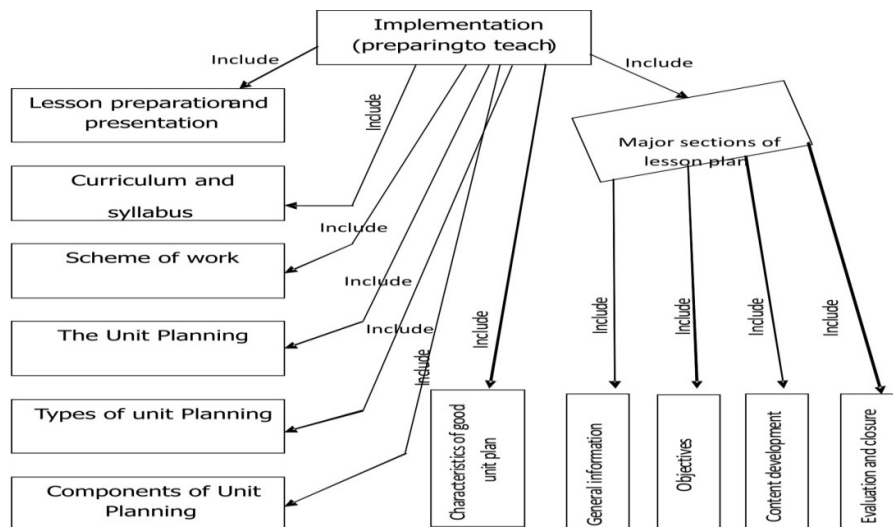
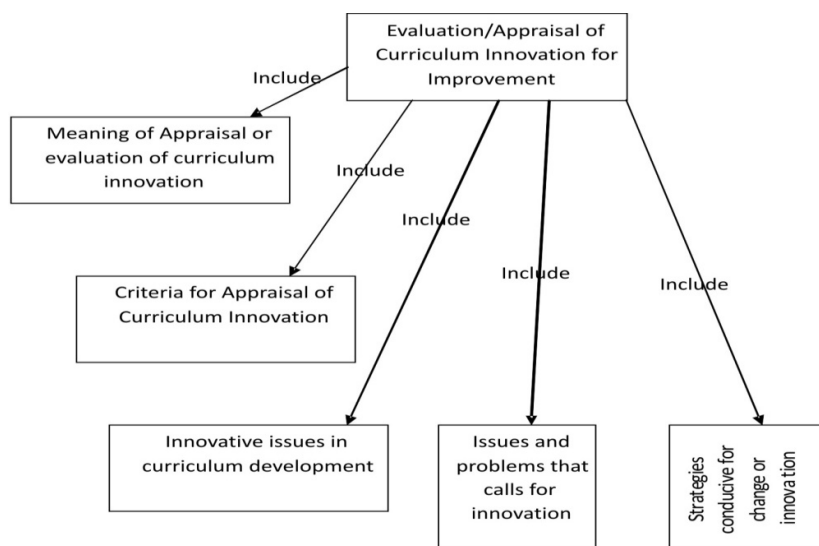
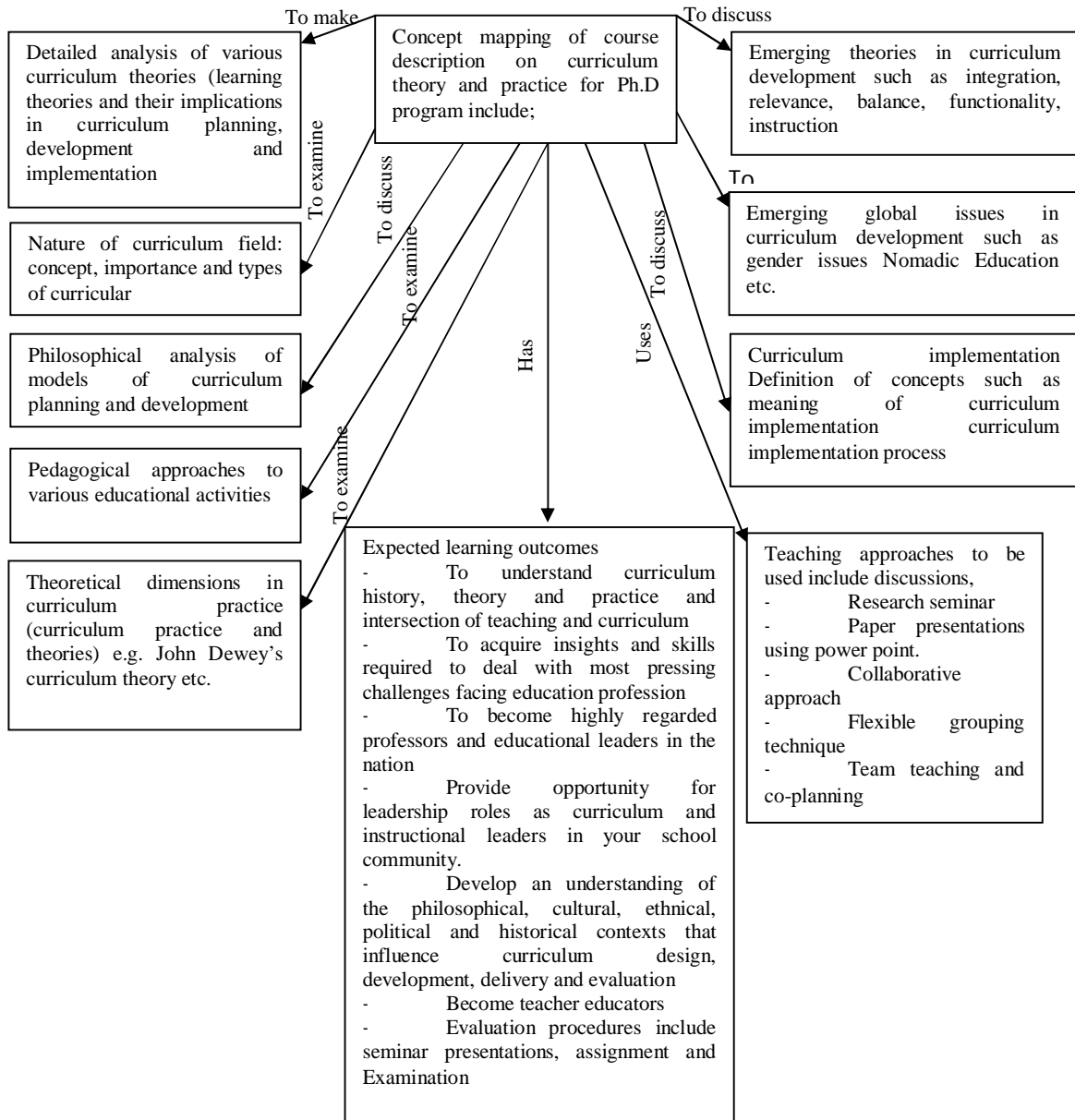


Figure 4: Concept Map illustrating the Integration of Related Learning Issues in One of the Concepts for the M.Ed Curriculum Theory and Practice.



**Figure 5: Concept Map illustrating the Integration of Related Learning Issues in One of the Concepts for the M.Ed Curriculum Course.**



**Figure 6: Concept Mapping of Course Description on Curriculum Theory and Practice for Ph.D Programme.**



Figure II is concept mapping of course descriptions on “curriculum theory and practice” at Ph.D level.

Figure II is concept map of the course titled “curriculum theory and practice” for Ph.D. program in Education. The course CTP is a core course and is therefore compulsory for all Ph.D students in faculty of education as mandated by National University Commission (NUC). The course is treated in one semester. The students have to cover the mapped concepts or topics starting from; detailed analysis of various curricula theories (learning theories) and their implications in curriculum planning, development and implementation. Students have to examine nature of curriculum field, concept, importance and types of curricula. They are expected to have good understanding of the philosophical analysis of models of curriculum planning and development. They are to examine the pedagogical approaches to various educational activities. Students are required to have full understanding of theoretical dimension in curriculum practice (curriculum practice and theories) e.g. John Dewey’s curriculum theory etc. They are required to discuss emerging themes in curriculum development such as integration, relevance, balance, functionality and instruction students are to examine emerging global issues in curriculum development such as gender issues, Nomadic education. Students are required to discuss curriculum implementation, definition of concepts such as meaning of curriculum implementation and implementation process.

Instructional approaches to be used include; discussions, research seminars, paper presentations using power point, collaborative approach flexible grouping approach, team teaching and co-planning as in masters degree.

The expected learning outcomes are adequately highlighted in the map. Students are required to have adequate understanding of curriculum history, theory and practice and intersection of teaching and curriculum. They are expected to acquire insights and skills required to deal with most pressing challenges facing education profession. In addition to the above expected learning outcomes, students are expected to come up with the following outcomes:

- To become highly regarded professors and educational leaders in the nation.
- To develop skills for leadership roles as curriculum and instructional leaders in their school community.
- To develop understanding of the philosophical, cultural, ethnical, political and historical contexts that influence curriculum design, development delivery and evaluation.
- To become teacher educators.

The evaluation procedures for the course include seminar presentation, assignment and examination which will be at the end of the course. The other foundation courses in faculty can be mapped as well. The concept map has the tendency to help the faculty to ensure coherence across the curriculum, to remain focused on the major themes they hope to convey and to continue their planning and re-planning without feeling of lost or neglecting important aspects of the course.

### **Benefits of Using Concept Mapping for Curriculum Designing**

1. In addition to the points already raised on the advantage of using concept map to design curricular, concept maps are helpful in guiding teacher educators especially in supporting materials and in choosing topics for global lectures.
2. The use of concept mapping for curriculum designing offers administrators and the faculty the opportunity to see at a glance concepts which lead to certification of M.Sc or M.Ed.
3. It affords the teachers or lecturers the opportunity to know what to be taught, how to teach it and hence get prepared for it.

4. It helps the learners to have insight on what to learn, prepare ahead of the lesson, learners also get intimated with the expected learning outcomes and hence remain focused.
5. It provides a very good platform for validating concepts as to know which concepts need pruning from the map and which needs additional emphasis.
6. Mapping curriculum concepts or course description for an educational program help students to quickly grasp the context of the courses in their program.
7. A curriculum map presented at the beginning of the program and used throughout the course of study, can promote clarity about intended outcomes of the academic program and how the courses in the program lead to successful performances in related courses.
8. From the instructional approaches mapped, students understand that its aim is to promote active learning and therefore learn to work in teams to solve problems and analyze concepts. Lecturers serve as facilitators of learning, helping students to integrate ideas and learning across lessons and courses clarifying issues and at the same time encouraging students to ask questions about concepts and about the course materials.
9. By mapping this one course, the head of departments and other professors in the department can use the curriculum mapping tool to assist the students in laying out their lessons to achieve their desired learning outcomes while Dean of the Faculty can review the curriculum maps to assure quality and alignment across the curriculum.
10. This mapping strategy can be used for every competency area and every course.
11. Faculty can also provide students with the completed maps to enhance their understanding of the educational road map they are expected to follow.
12. Considering the effectiveness of concept mapping in organizing complex material it is a natural fit for faculty to make good use of curriculum maps to plan, develop and implement their courses.
13. Mapping course concepts is a means through which the faculty showcases what it has to offer at international level.

### **Conclusion**

The author of this paper has examined the effectiveness of concept mapping as a teaching strategy and a tool for mapping curriculum concepts/course description. Research evidence of its effectiveness was given. The author applied the knowledge of concept mapping as a teaching strategy in designing and mapping course descriptions on “curriculum theory and practice” at post graduate levels (Masters and Ph.D programs) in faculty of education in the university. Instructional approaches and expected learning outcomes were adequately presented as mandated by national university commission for faculty of Education, at Ph.D level.

### **Suggestions**

- ⇒ The author suggests, that tertiary institutions should adopt concept mapping strategy as a veritable tool in teaching and learning.
- ⇒ Also, faculties in tertiary institutions should adopt it for mapping curricula concepts for understanding, collaborating, validating and integrating curricular contents that are meant for developing specific competences in post graduate level program with Nigeria context.

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