



Health professions education in the 21st century: A contextual curriculum framework for analysis and development

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ABSTRACT

Curriculum remains a vital aspect of any educational program. It is a plan on which any educational program is built; therefore, its design must provide all important elements that will ensure the realization of the set objectives or outcomes. This framework, therefore, provides a guide from design to the implementation, analysis, and provides ways to identify the strength and weaknesses of a program. This contextual curriculum framework highlights the purpose of the program, the needs it meant to meet, and the objectives or the expected outcome. It emphasizes the need to carefully select and organize the contents to allow for the realization of the learning outcomes. Similarly, the educational or instructional strategies must be carefully selected in line with the goals and objectives and aligned with the assessment strategies. A curriculum should also provide detailed information on the assessment modality and how the process will be managed so as to ensure effective and efficient implementation and evaluation of the curriculum. This framework identifies six important points that must be looked into when carrying out curriculum development or analysis, more importantly in the health professions education.

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Introduction

Globally, there have been efforts to transform medical education to meet the need of the consumers of its end products. Various agencies [1–4] have tried to identify and define what competencies, skills, values, and attitudes a medical graduate need to possess to practice effectively and efficiently in the 21st century. This necessitates the need to develop a curriculum that will afford medical and other health professional graduates the opportunities to develop such competencies.

In line with this, the World Health Organization [5] proposed the need for transformative scaling up of health professional education, i.e., sustainable expansion of health professional education, and training to increase the quantity as well as quality and relevance. This emphasizes the need to ensure that health professional graduates are not just competent, but locally relevant to the community they are meant to serve.

According to the Association of American Medical Colleges [1], there are several competencies expected of a medical graduate. He or she must possess the ability to demonstrate ethical behavior and professionalism, the ability to communicate with patients and develop a patient–doctor relationship, relate with peers and other members of the health team. In addition, they must be able to apply scientific knowledge to solve clinical situations, take a clinical history, carry out both physical and mental state examinations, and select appropriate investigations, then diagnose medical conditions, and institute appropriate management.

Curriculum, however, provides opportunities to structure all learning experiences offered by an educational institution to ensure such goals are achieved [6,7]. It is a statement of the intended aims and objectives, educational experiences, outcome, and processes of an educational program [8]. It provides a way of structuring learning experiences, fostering achievement of learning goals and objectives, and ensuring mastery/competence for external

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stakeholders. In developing any framework, all these factors must be put into consideration in order to ensure that a curriculum actually serves the purpose for which it was designed.

The Relevance of the Curriculum Framework

The curriculum framework provides a guide in ensuring that all essential components of a curriculum are given utmost attention during its development and improvement. Most curriculum frameworks as we know take their root from the work of Tyler [9]. He proposed a four-stage curriculum framework. According to Tyler, there are four important issues to consider in developing a curriculum: the purpose, the educational experiences that will aid in achieving the purpose of the curriculum, how such experiences are organized, and finally the way to ensure that the purpose has been achieved. The 10 questions developed by Harden [10] however built on this and give a clearer picture, particularly for the non-educationist. It is not just enough to determine the purpose but also identifies the need in relation to the learners, the community, and other stakeholders.

The importance of having definite goals and objectives, as well as outcomes, was well documented in the literature [8,10,11]. These dictate the contents, the educational strategies, and the methods to evaluate learners and the curriculum [11]. Besides serving as a blueprint for assessment, it also suggests what assessment methods will be most appropriate and communicates to others what the curriculum hope to address and achieve [11,12].

The educational objective describes what is expected of each student in term of cognitive, affective or psychomotor abilities. The Bloom's taxonomy [13] provides an effective way of describing the learning objectives in terms of levels of cognitive skills (Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation) as outcome expected of a student. Similarly, Miller's Pyramid [14] (Fig. 1) depicts different levels of competence (i.e., knows, knows how, shows, shows how, and do); this can be used in constructing objectives in health professions education and determine what level of competence a student is expected to demonstrate after going through such a curriculum or program.

It is not just enough to determine the contents, but the way the contents are organized is also important. There are various options. The learning experiences can be integrated, i.e., cuts across subject matter lines and bringing together various

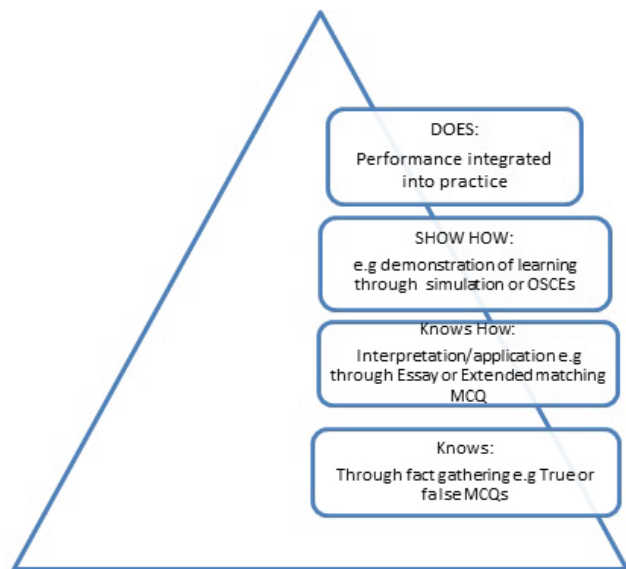


Figure 1. Millers pyramid.

aspects of the curriculum together [15]. It can also be modular, or with core and options, i.e., the curriculum is built around the essential aspect of each subject or discipline and the essential competence to practice [8]. It can also be spirally arranged with learning experiences arrange with increasing complexity and new learning related to previous ones, or with overall competencies of students increase as the learning advances [16]. Most medical curriculum often takes a mixture of all these approaches [8,16].

Most of these authors also documented the need to identify educational experiences that are likely to bring about the accomplishment of the objectives of the curriculum. This emphasizes the need to identify teaching and learning approaches to be adopted and the underpinning learning theories and educational resources that will bring about the achievement of goals and objectives of the curriculum.

Assessment practice is another important aspect of the curriculum that needs to be properly defined. Assessment drives learning; therefore, assessment practice should be fashioned in a way to ensure that students are provided with the opportunity to learn. Since multiple areas of competency are usually assessed in medicine and other health professions education, multiple assessment methods should be employed. Such methods must not just be reliable but also valid, i.e., the assessment methods should be able to ensure relatively consistent results as well as assess the intended skills. There must be a constructive alignment between teaching and learning methods, assessment strategies, and the expected learning outcomes [17].

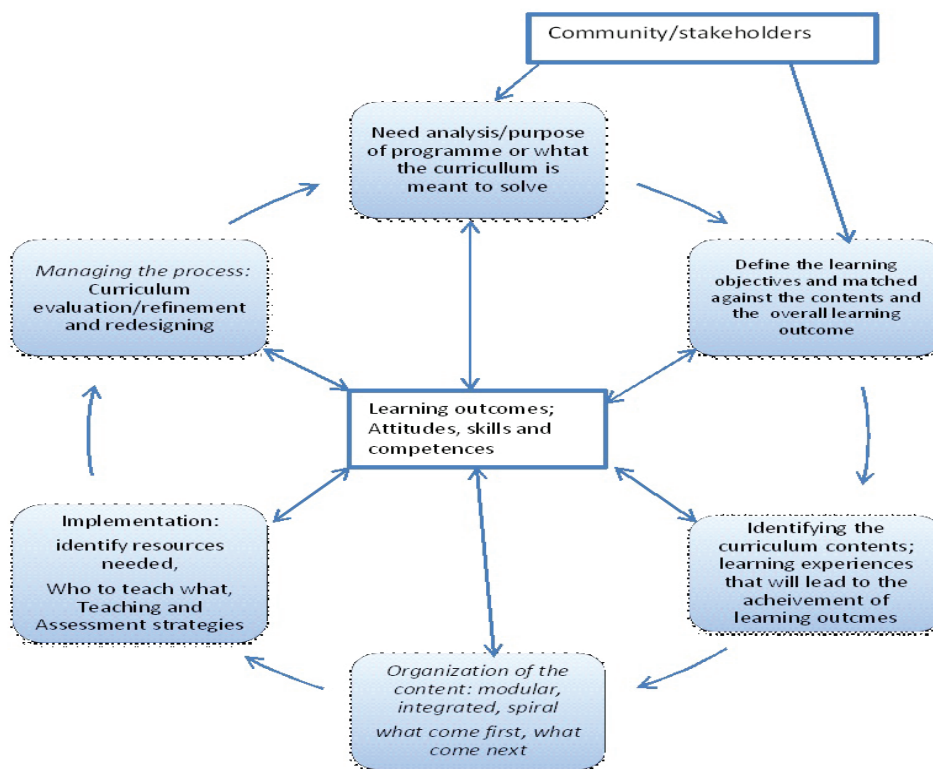


Figure 2. Curriculum framework wheel.

Designing a good curriculum without an efficient way to communicate it to the end users will be an effort in futility; hence there exists a need to design a way to communicate it to the end users; the students and the teachers alike. This can take the form of syllabus and timetable. This shows a list of what to cover, when to be taught, and how it will be taught. Presentations of the curriculum can also be done in relation to the aims and objectives of the course.

It is also important to determine the kind of educational environment or climate to be fostered. The success of any program will depend on the environment. An environment that fosters dedication, the commitment of teacher as well as ensuring students are hard-working is likely to ensure that the aims and objectives are realized [8].

It is one thing to design a good curriculum and another thing is to ensure effective and efficient implementation. Therefore, to ensure curriculum implementation, it is important to mobilize political, social, and economic support from all authorities concerned and also identify resources needed and ensure their availability [11]. Likewise, it is important to identify and address those things that may want to serve as barriers to implementation and attend to them. Curriculum development is not a straightforward thing; each component affects

and interacts with others (Fig. 2). For example, the expected outcomes determine the contents, and the contents determine the level of maturity of students, i.e., the stage of education at which such content will be taught, and who and who is to teach what and what. Similarly, the teaching strategies are influenced by who is being taught and the setting and the intended competency or outcome. For example, teaching clinical interview skills to a fresh clinical student may necessitate using role play, clinical demonstration at bedside or using a simulator, rather than a mere description of the process.

Usually, progress is often made on two or more steps simultaneously; progress in one step can influence progress in others. For example, an evaluation can inform the need to modify or refine the objectives. Likewise, the intended outcome also influences the curriculum content, determines the learning objectives and the assessment methods (Fig. 2). This framework provides a substrate in either developing or analyzing a curriculum.

Developing the Analytical Framework

The framework should emphasize some important aspect of the curriculum that must be given utmost attention: identification of the needs/the problems to be solved or purpose(s), the goals and the objectives,

the content and its organization, and the assessment strategies to be implemented. This analytic framework was developed in line with existing frameworks with an intention to serve as a guide for curriculum analysis, more importantly in medical and other health professions education. These are summarized in Figure 2 and discussed more in detail below:

The need and the purpose of a curriculum or a program

The first thing to consider in curriculum development is the identification of the problem, the need or the purpose such a curriculum will serve and who the target audience will be (Fig. 2). This can be done through need assessment or evaluation by the stakeholders such as community leaders, faculty staff, and the ministry of health or non-governmental organization. For example, inadequate mental health practitioners are observed in most sub-Saharan African [18,19], particularly in rural areas and there exists the need to scale-up mental health practitioners in such communities. The problem or need identified is the shortage of mental health practitioners in rural communities. The purpose of the curriculum will be to scale-up training of middle manpower mental health practitioners who will serve in rural communities. This can be through the inclusion of a mental health curriculum in the existing program for middle manpower health care provider or develop a new program or curriculum.

The learning objectives and outcomes

After the identification of the need, the next step will be to define the objectives of the curriculum based on the need analysis. This drives the expected outcome or the skills/competencies the end products of such a curriculum must possess. The outcome is the destination while the learning objectives are the road map to the destination. Therefore, it is important to ensure that such objectives are realizable considering the time available and the prior knowledge of the students.

The objective specifies what and what the students need to know, identify, apply, analyze, evaluate, or create (Bloom's taxonomy) in order to attain the desired outcome/competency or skills required for the end products of such curriculum. It is important to identify the learning outcomes in terms of knowledge, skills, attitudes, and behavior. Also, the level of skills based on Millers' Pyramid (Fig. 1) at which the students will operate need to be specified. As shown in Figure 2, the desired

learning outcomes drive other aspects of the curriculum: the curriculum content, the instructional strategies, the assessment practice, even the material, and human resources needed in the implementation. It is important to determine whether the curriculum is focusing on the end product, i.e., the outcome or just a mere description of an event. The outcome approach to curriculum design helps in identifying practitioners' characteristics, the expected skills and knowledge, and ensuring these competencies are well developed [20].

Course content that will facilitate the accomplishment of the objectives or learning outcomes

Determining relevant topics, skills, attitude, and behavior that will promote the accomplishment of the learning objectives and outcomes is essential. Likewise, it is important to determine how these contents will help in achieving the course objectives and the objectives of the generic curriculum (if this is a course or a module in a program). There is a need to identify the resources (books, audio-visuals, clinical laboratory, computer-based learning, and e-learning opportunities) available to students in order to achieve the objectives.

The organization of the content

The organization of the content is as important as the content. What subject or module will come first and what will follow, and at what stage of the education will they come. Will the contents be integrated with other contents of the main curriculum or not; more importantly, whether it is going to be incorporated into the existing curriculum. If yes, will the content be vertically or horizontally integrated? Some authors have pointed out that integration breaks down barriers between basic and clinical sciences in medical education and that promotes retention of knowledge through repetition and progressive development of concepts and their applications [21]. Or rather will the content be spirally arranged with the themes and topics repeated with an increasing level of difficulty with application throughout the curriculum? [16] and how will the new experiences be linked with previous experiences? These are important questions to ask in ensuring the spiral arrangement of the contents. Likewise, it is important to determine whether any of the content will be compulsory or optional and whether there will be a place for a modular arrangement of the contents [8]. The arrangement of the timetable is also important: the time for theories

and the time for clinical activities at the hospital or the community. It is essential to see whether the extent or the order of the content is appropriate and whether the overall organization aligned with the learning strategies and the desired outcomes.

Implementation

This varies from identifying human and material resources needed in achieving the learning outcomes to the educational strategies that will facilitate learning and the assessment methods that will be adopted to determine how far the expected outcome or competence has been achieved (Fig. 2). The human resources involve identifying the faculty and the level competence they themselves must possess.

Educational strategies

Determining educational strategies involve identifying what learning theories (e.g., cognitivist, behaviorism, experiential or constructivist) underpin teaching and learning [22] and how well these can be effectively used to ensure the objectives and the learning outcomes are accomplished. In addition, it involves identifying teaching and learning methods that will be appropriate in achieving the objectives and ensuring the outcomes—didactic lectures, small group discussions, problem-based learning, self-directed learning, computer-based learning or e-learning, etc. The way clinical skills will be taught (such as bedside teachings, small group discussion, use of simulators, use of mannequins, video recordings, and clinical skill laboratory) also need to be properly structured.

It is also important to determine what innovative approaches can be adopted in driving the curriculum [23]. Is there any place for SPICES or other innovative strategies such as e-learning, problem-based on-line learning sessions (e.g., case studies), telemedicine or tele-health? The acronyms SPICES by Harden et al. [24] provide educational strategies for implementing medical curriculum. It represents a dimension between two extremes: an innovative approach and the traditional approach. The S-stands for student-centered, a deviation from the traditional teachers-centeredness, P-represents a problem-based approach to teaching and learning, I-stands for Integrated; here, various themes are integrated between subjects or disciplines depending on how these relate to each other. C-community-based: this provides an opportunity for students to have direct contact with the community they plan

to serve after graduation, E-Electives: this allows for the flexibility of learning experiences and gives learner to explore other areas of interest and lastly S-represents a systematic approach, i.e., a program that is structured and organized around core competencies.

The assessment methods

The assessment practice provides a way of ensuring that students focus on learning and the intended outcomes are achieved [25]. The assessment can provide information on how much students have learned and how far the intended outcomes have been achieved (summative) or assessment for learning, providing an opportunity to drive learning (formative) with emphasis on feedbacks. There is a need to ensure assessment practice is valid and reliable. The assessment strategies must be able to assess whether the learning outcomes as set in the curriculum have been achieved or not. Assessment in medical education often involves multiple methods [26]. According to Downing and Yudkowsky [27], several methods such as multiple-choice questions (MCQs), short and long essays, oral examination, objective structured clinical examination (OSCE), objective structured long examination record, and mini-clinical examination provide the opportunity for the multiple competencies to be assessed. The choice of a method will depend on its reliability as well as validity with reference to the expected outcomes. Based on Bloom's taxonomy and in line with the objectives, it is important to determine the level of cognitive skills at which students will be assessed. Similarly, using the Millers pyramid, it is important to determine the levels competency expected of learners.

Case Vignette

This case scenario illustrates a practical approach to explaining some of the concepts discussed above. From the earlier example above, inadequate mental health practitioners have been observed in most sub-Saharan African countries most importantly in the rural areas and the need to scale-up mental health practitioners in such communities. From the need analysis, there is a shortage of mental health professionals in most rural communities. The purpose of the curriculum is to scale-up training of middle manpower mental health practitioners that will serve in such rural communities.

The next thing will be to set the objectives of the program and determine the competencies or skills

the product of such a curriculum should possess. This will drive the expected learning outcome (i.e., the ability to identify and treat common mental illness in such communities). Specific objectives may include, training manpower who are able to *know* the mental health need of the local communities, *identify* features of common mental illnesses (such as anxiety disorders, depression, bipolar, schizophrenia), *provide* basic psychological support, and *treat* such by *applying* treatment algorithms in the diagnoses and treatment of such disorders.

The contents of such a curriculum will be driven by the set objectives and the learning outcomes. It may include such topics like psychological evaluation, psychological first aid, and the common mental illnesses prevalent in the communities and their symptoms and signs, presentations of such signs and symptoms, and the knowledge of treatment algorithms for triaging mental health needs. Basic knowledge of various treatment options and the socio-cultural context in which the management of such patient will take place may also be essential.

Following this, is how such content will be arranged: modular, spiral or integrated, and what level of the academic will they come, and what topic should come first, and followed by what and what are the essential questions to be answered for the sequential building of knowledge. These are important information to consider under curriculum content organization.

In implementing, there is a need to identify available human and material resources. Where will the training take place and who will be trainer? For example, where there is an existing structure to train middle manpower to treat other health issues, such mental program can be incorporated into such, then identify who will teach different topics or modules (psychiatrists, psychologists, psychiatric nurses, or mental health social workers). Then, identifies the place where the training will take place: community, primary health care centers, etc. The teaching strategies will depend on the desired level of competence. These may involve both theoretical and practical or clinical teaching session. This can incorporate didactic teaching, small group discussions, role-play, problem-based learning, community-based education, telemedicine or telehealth, and practical demonstration of the use of treatment algorithms at primary care centers. These will promote cognitive, behavioral, and experiential learning, and aimed at maximizing learning and active engagement of learners.

The format of the assessment will also be driven by the learning objectives as well as the outcome. It is important to ensure constructive alignment between learning objectives/outcomes and assessment strategies. In this case, the assessment is to demonstrate the level of “know” and “know how” maybe to some degree of “show how.” This can be assessed using written examination: MCQs and essay and “show how” by OSCE. The assessment strategies also provide a way to evaluate the learning outcomes: whether they are being achieved or not. This call for the need to ensure the assessment strategies is reliable and valid.

Managing the process

The final stage of the framework is to establish how the process will be managed: from implementation to evaluation. For effective delivery of the curriculum, people who are responsible for planning, implementation, or evaluation of the curriculum should be assigned to different roles. The role of the Dean, Head of Department, and the course lecturers as well as that of the students in ensuring the implementation and those that will be saddled with curriculum evaluation should be clearly stated. Evaluation of the curriculum helps in identifying the extent to which a curriculum has achieved its learning outcomes and what refinement or modification to be made. Curriculum analysis provides the opportunity to identify the strengths and shortcoming of the existing one, in order to refine it and improve its’ structures.

Conclusion

The six steps enumerated above provide the framework for curriculum analysis. It is essential to ensure that all these important elements are provided to ensure learning opportunities are maximized and educational objectives and outcomes of the program are realized. The purpose of the program as well as the needs it meant to serve, the learning objectives, and the expected outcomes must be clearly stated. The content must be carefully selected and organized to ensure the realization of the learning objectives. Similarly, the educational strategies must carefully be selected in line with the goals and objectives and aligned with the assessment strategies and learning outcomes. The curriculum should also provide information and how the process will be managed so as to ensure effective and efficient implementation and improvement of the curriculum. The curriculum framework provides a structure to ensure all

these components are put into consideration so as to achieve the desired learning outcomes.

Conflicts of Interest

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