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Curriculum development for improving medical education at the Dogliotti College of Medicine, University of Liberia

A.J. Fauci, Z. Adams Jr. , A. Mazzaccara, T.L. Freeman, A.S. Aden,
N. Cozza, A. Trama, G. Tarsitani, R. Guerra



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Curriculum development for improving medical education at the Dogliotti College of Medicine, University of Liberia

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2015, v. 54 p. Rapporti ISTISAN 15/15

In Liberia, due to the long civil war which caused the flight of many health workers and the looting and destruction of healthcare facilities, the health workforce gap is one of the major bottlenecks to the success of the health system rebuilding and the improvement of the population health status. The report focuses on the design and implementation of a process for the development of a new medical curriculum for the Dogliotti College of Medicine in Monrovia, carried out in the framework of a project financed by the Ministry of Foreign Affairs and aimed at improving the College capacity to train competent and qualified doctors. The new curriculum provided for the introduction of integrated courses, a credit system for evaluation and the harmonization with the curriculum developed by West African Health Organization (WAHO) for the Economic Community of West African States (ECOWAS) regional medical schools. Characterized by a strong adherence to the scientific curriculum-building principles and an evident participatory character and a formative function, the new curriculum represents an instrument and a method: a toolkit, meaning a set of tools and resources for the development of competences and abilities, which is at the same time flexible and replicable.

Key words: Curriculum development; Medical education; Health workforce; Liberia

Istituto Superiore di Sanità

Sviluppo curriculare e miglioramento dell'offerta formativa della Facoltà di medicina "Dogliotti" dell'Università della Liberia.

Alice Josephine Fauci, Z'Sherman Adams Jr., Alfonso Mazzaccara, Tabeh L. Freeman, Abdulaziz Sharif Aden, Nicola Cozza, Annalisa Trama, Gianfranco Tarsitani, Ranieri Guerra
2015, v. 54 p. Rapporti ISTISAN 15/15 (in inglese)

In Liberia, a seguito della lunga guerra civile che ha provocato l'esodo del personale sanitario e il saccheggio e distruzione di gran parte delle strutture, la carenza di personale rappresenta l'ostacolo maggiore per il successo della ricostruzione del sistema sanitario e il miglioramento dello stato di salute della popolazione. Il rapporto descrive la progettazione e realizzazione del processo di sviluppo di un nuovo piano formativo per la Facoltà di medicina "Dogliotti" di Monrovia, nell'ambito di un progetto finanziato dal Ministero degli Affari Esteri e finalizzato al miglioramento della capacità del College di formare medici competenti e qualificati. Il nuovo curriculum ha previsto lo sviluppo di corsi integrati, un sistema di crediti per la valutazione e l'integrazione con il curriculum sviluppato dalla *West African Health Organization* (WAHO) per le scuole di medicina nell'area della comunità economica degli stati dell'Africa occidentale (*Economic Community of West African States*, ECOWAS). Caratterizzato da una forte aderenza ai principi del *Scientific Curriculum-Building* e da un forte carattere partecipativo e formativo, il nuovo curriculum rappresenta uno strumento e un metodo: un toolkit, inteso come un insieme di risorse volte a sviluppare competenze e abilità, che è allo stesso tempo flessibile e replicabile.

Parole chiave: Sviluppo curriculare; Formazione sanitaria; Personale sanitario; Liberia

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1. HUMAN RESOURCES FOR HEALTH IN AFRICA: THE CASE OF LIBERIA

1.1. Africa's health workforce crisis and role of medical education

Recent studies show evidence of a direct and positive causal link between numbers of health workers and health outcomes. There is a consensus emerging that one of the key elements to achieving improved health outcomes is stronger health systems, including an adequate health workforce (Travis *et al.*, 2004). Human resources are the cornerstones of any health system, since no health system can function without a sufficient number of motivated and qualified doctors, nurses, midwives and community health workers.

In 2006, the World Health Organization (WHO) estimated that about 4.3 million doctors, nurses and health care professionals are missing worldwide (WHO, 2006). The situation is particularly critical in Sub-Saharan Africa, which supports the burden of the 24% of global diseases but has only the 3% of the global health workforce, paid with less than 1% of the global health budget. Increasing recognition of the critical health workforce situation in Africa has become a recent focus of global attention (Chen *et al.*, 2004; WHO, 2006; WHO and Global Health Workforce Alliance, 2008; Global Health Workforce Alliance, 2008). Attention has now focused on education and retention of medical doctors in Africa, in order to provide high level clinical care and research and to participate in public health work, management, education and policymaking.

In Africa, the two major challenges facing health care delivery systems are a reduced numbers of doctors, partly attributable to medical migration, and inadequate skill development of the indigenous doctors to cope in resource-poor settings, especially in the rural areas (WHO, 1995). Sub-Saharan Africa has an estimated 145,000 physicians (WHO, 2010) (5% of the 2,877,000 practicing physicians in Europe) to serve a population of 821 million (more than the population in Europe) (United Nations Population Division, 2009). Overall, Sub-Saharan Africa has a physician-to-population ratio of 18 per 100,000, compared with countries such as India (60 per 100,000), Brazil (170 per 100,000), and France (370 per 100,000). Some countries, such as the United Republic of Tanzania and Malawi, report as few as 2 physicians per 100,000. These very low physician-to-population ratios in Sub-Saharan Africa result from several factors, including small medical school outputs, both due to a low overall number of medical schools and low enrolment at each school, and the tendency to migrate out of the country or to locate in urban areas (Chen *et al.*, 2012; Mullan *et al.*, 2011).

Substantial emphasis is often put on training as a solution to human resources difficulties. A recently conducted survey of Sub-Saharan medical schools (Greysen *et al.*, 2011; Mullan *et al.*, 2011; Chen *et al.*, 2012) has shown that many countries are scaling up medical education as part of health sector strengthening. Medical schools and medical educators have a key role to play in improving the population's health by addressing the underlying doctor shortages that have reached crisis levels in this region. However, training capacity is especially low in Sub-Saharan Africa, where two thirds of the countries have only one medical school and some have none (Narasimhan *et al.*, 2004). Moreover, the constraints to effective strategies based on training are many. Africa's paucity of medical schools points to the need for innovative approaches to improve training capacity in the short terms, since a sole investment in medical training

infrastructure is unlikely to be feasible in the short term and unlikely to be the most cost-effective strategy in the long term.

When medical education became established in Africa, many curricula were adopted from the West. Over the last half a century, major global pedagogical shifts and innovations in medical training have occurred (Gukas, 2007). However, very few medical schools have followed such innovations or succeeded in their implementation, despite the general acknowledgement that limited competencies among doctors and reduced numbers from medical migration in Africa could be corrected through innovative curricula (Mufunda *et al.*, 2007). In Sub-Saharan Africa survey of medical school, curricular issues were mentioned among the greatest needs for increasing the quantity and quality of medical school graduates (Chen *et al.*, 2012).

These considerations provided the rationale of the development of the new medical curriculum that was carried out by the Istituto Superiore di Sanità (ISS, the Italian National Institute of Health) within the framework of a cooperation project financed by the Italian Ministry of Foreign Affairs (Ministero degli Affari Esteri, MAE), aimed at strengthening the training capacities of the “A. M. Dogliotti College of Medicine” (hereafter Dogliotti College) in Liberia.

1.2. Liberian post-war context: a collapsed health and medical education system

Liberia, a West African country of 3.5 million people, emerged in 2003 from fourteen years of civil war, which caused tens of thousands of deaths, the exodus of hundreds of thousands of people and the near-total destruction of the country’s political, cultural and socio-economic structures. In addition, the devastating civil war caused the collapse of the health system, which suffered the migration of health personnel, particularly physicians, the looting and physical destruction of much of the existing health facilities.

The shortage of health personnel, and in particular of doctors, is dramatically evident, together with its consequences on the health of the population. Of the 293 public health facilities operating before the war, 242 were deemed non-functional at the end of the war (National Transitional Government of Liberia, 2004). Doctors, nurses and other health workers fled the country, leaving less than 20 physicians to serve a population of 3 million (WHO, 2003). Outside Monrovia, where humanitarian agencies provided some services, most of the population had little or no access to healthcare.

The government of Ellen Johnson-Sirleaf, elected in 2005 in the country’s first post-war democratic election, faced a disastrous socio-economic and health situation. Although since the end of the war in 2003 Liberia has been making steady strides towards peace, stability, recovery and economic growth, however, the majority of the population (84%) continues to live in poverty, subsisting on less than US\$ 1,25 per day, which is considered the international poverty line (World Bank, 2010).

In response to the post-war challenges, the Ministry of Health and Social Welfare, with the assistance from donors and international nongovernmental organizations (NGOs), embarked on rebuilding the health system, with the priority aim of expanding the provision of primary care, particularly in rural areas that were underserved even before the war. The 2007 National Health Plan outlined a Basic Package of Health Services (BPHS) to be provided without charge at clinics and hospitals throughout the country. The preventive and curative interventions in the BPHS target particularly infectious diseases and the huge maternal and child morbidity and mortality (Lee *et al.*, 2011).

Despite the relative success of the National Health Plan 2007-2011 – access to essential health services has increased from 35% in 2009 to 80% in 2010 (World Bank, 2011) – and the subsequent launch in 2011 of the Essential Package of Health Services (EPHS), Liberia continues to present very poor health indicators, especially among women and children in rural areas.

The 2007 Liberia Demographic Health Survey measured the Maternal Mortality Ratio (MMR) at 994 deaths per 100,000 births – representing a 71% increase from the 2000 estimate of 550/100,000 (Liberia Institute of Statistics and Geo-Information Service, 2008). In contrast to the rising of MMR, Liberia has seen improvements in the Under-Five Mortality (U5M) rate which declined from 220 deaths per 1,000 live births in 1986 to 110 deaths per 1,000 live births in 2007, which is still high and far from the Liberia Millennium Development Goal (MDG) target of 82 in 2015. Although child mortality is lower than during the war, current levels are still 10-fold as high as those of developing countries and maternal mortality is among the highest in the world (UNICEF, 2007).

Malaria, which is endemic in Liberia, remains the leading cause of morbidity and an important contributor to under-five mortality, measured in 2010 as 18% of deaths among children aged <5, together with pneumonia (14%). Child health in Liberia still faces daunting challenges, most notably chronic under-nutrition, as the stunting prevalence of children aged <5 has steadily risen over the last decade and is currently measured at 42%. Liberia is also faced with other infectious diseases burden, since data on distribution of years of life lost by causes show that the 82% is caused by communicable diseases in 2008, while the estimated prevalence of tuberculosis is at 476 per 100,000 population in 2009, the regional average being at 332 and the global average at 178 (WHO, 2012).

The correlation between availability of health personnel, coverage of the health services and health indicator trends appears evident when considering data on the utilization of health services, with only 46% of births attended by skilled health personnel – with significant disparities between rural (32%) and urban (79%) areas – while less than 20% of the population has access to improved sanitation facilities (WHO, 2012).

As for the current status of the human resources component of the 2007-11 NHP, only 30% of the workforce is skilled (e.g., doctors, nurses and midwives) (US Government Global Health Initiative, 2011). Moreover, with 3 workers (doctors, nurses and midwives) per 10,000 population, Liberia is well below the minimum worker density threshold of 23 workers per 10,000 population that was established by the WHO as necessary to deliver essential maternal and child health services (data of the WHO Global Atlas of the Health available from <http://apps.who.int/globalatlas/default.asp>).

Liberia thus faces a chronic shortage of health workers, particularly in jobs that demand specialized skills such as medical doctors and specialist. Indeed, the collapse of the health system due to the long period of civil conflict and social turmoil resulted in the disruption of the health training system, especially for medical doctors whose only officially recognized training institution was the “A.M. Dogliotti College of Medicine” (after the Italian philanthropist Achille Mario Dogliotti), the Faculty of Medicine of the University of Liberia. Founded in 1968 as an example of a technical cooperative venture involving the Government of Liberia, the Holy See, the Dogliotti Foundation and the Italian Government, the Dogliotti College was affiliated with the Faculty of Medicine and Surgery of the University of Turin in Italy. In 1970 it was merged with the University of Liberia and a year later, the John F. Kennedy Memorial Hospital became the teaching hospital of the College of Medicine. The substantial technical and material support provided by the Dogliotti Foundation was then scaled down according to plan in the 1980s before the inception of the civil war in December 1989. The College was then closed in May 1990 to re-open two years later with the bare minimum training capacity.

In this context, following a state visit by the Liberia President, Mrs Ellen Johnson Sirleaf, to Italy in 2007 and an official visit of the Italian Ambassador in Abidjan in 2008, the need of a

structural and technical intervention in support of the Liberian health sector and in particular of the Dogliotti College was considered urgent. The Italian Ministry of Foreign Affairs nominated the ISS as the organization responsible for designing and implementing a project titled “Strengthening the training capacities of the A.M. Dogliotti College of Medicine in Monrovia”, with the collaboration of the Liberian Ministry of Health. The project, financed by the Italian MAE and the Direzione Generale Cooperazione Sviluppo (DGCS, General Direction for Development Cooperation), officially started in April 2009 and was aimed at improving the College capacity to train competent and qualified doctors. The project foresaw an infrastructure rehabilitation component, which was implemented directly by the DGCS, and a component concerning the medical training standards improvement, which was implemented by the ISS, supported by the Fondazione per la Sicurezza in Salute (FSS, Foundation for Health Safety).

The present report focuses on the latter component, implemented by the ISS (hereafter ‘the ISS Project Component’), and is related to the design and implementation of the development process of a new medical curriculum for the Dogliotti College.

1.2.1. The Dogliotti College academic program

The Dogliotti College is a state-owned institution of higher learning. As a part of the University of Liberia Academic Programs, the College is headed by a Dean, appointed by the President of the University upon the recommendation of the Technical Advisory Board of the College, subject to the approval of the Board of Trustees of the University. The Dean is assisted in the academic and administrative activities of the College by an Associate Dean who is also the Chief Medical Officer of the JFK Medical Centre, which serves as Teaching Hospital of the College. The Dean is also assisted by the Pre-clinical and Clinical Coordinators who are appointed by the Dean to be responsible for the coordination of the Pre-clinical and Clinical Divisions of the College. These academic administrators work through the chairpersons of departments in consultation with the Office of the Dean.

According with the curriculum in force, revised in October 2001, the College runs a 5-year academic program, with a residency requirement of five to seven years. The curriculum is divided into two Divisions: Pre-clinical or Basic Science and Clinical Divisions. Each Division runs a two-and-a-half-year program. As shown in Table 1, the Pre-clinical Division has 7 Departments, and the Clinical Division provides clinical clerkship and rotations in six Departments.

Table 1. Number of teaching staff per Divisions and Departments of the old Dogliotti College curriculum (2010)

Division	Department	Professors	Assistant professors	Other teaching staff	Total
Pre-clinical	Human anatomy	0	1	1	2
	Physiology	0	1	1	2
	Pharmacology	0	0	1	1
	Microbiology/parasitology	0	1	2	3
	Biochemistry	0	0	1	1
	Pathology	1	0	0	1
	Public health	0	2	4	6
Clinical	Internal medicine	1	2	0	3
	Surgery	2	5	1	8
	Paediatrics	0	1	0	1
	Obstetrics/gynaecology	0	1	1	2
	Radiology	0	1	0	1
	Psychiatry	0	0	1	1

There were a total of 36 courses leading to the degree of Doctor of medicine at the Dogliotti College, as shown by Table 2.

As for the Medical College number of students, Table 3 shows the 2010 situation.

Table 2. Courses by academic year and semester of the old Dogliotti College (2010)

Division	Year	Semester	Course
Pre-clinical	1	1	Gross human anatomy 1
			Histology
			Biochemistry 1
		2	Embryology
			Gross human anatomy (neuro) 2
			Physiology 1
	2	1	Biochemistry 2
			Public health 1
			Microbiology 1
			Parasitology
		2	Physiology 2
			Public health 2
			Pharmacology 1
			Microbiology 2
Clinical	3	1	Pathology 1
			Clinical physiology 1
			Public health 3
		2	Pharmacology 2
			Pathology 2
			Clinical physiology 2
	4	1	Public health 4
			Pharmacology 3
			Radiology
			Clinical pathology
		2	Introduction to medicine
			Public health 5
			Introduction to paediatrics
			Introduction to surgery
5	Clinical rotation	Internal medicine	
		Paediatrics	
		Surgery	
	5	Clinical rotation	Obstetrics/gynaecology 1
			Obstetrics/gynaecology 2
			Psychiatry
			Public health 6
			Surgical sub-specialties

Table 3. Students by sex and course year of the old Dogliotti College (2010)

Year	Male	Female	Total
1	24	19	43
2	25	9	34
3	0	0	0
4	20	13	33
5	6	7	13
Total	75	48	123

As for the academic policies with reference to enrolment at the Dogliotti College, the main admission requirements, besides common administrative matters, are:

- To be a holder of a Bachelor of Science (B.Sc.) Degree in Biology, Zoology or Chemistry, with a minor in any of the other two disciplines, from a recognized University.
- To have a cumulative Grade Point Average of 2,500 or above, with grades ranging from B upward in the biological sciences.
- To satisfactorily pass the General College Requirement courses in English, Mathematics, and Social Sciences.

2. CURRICULUM DEVELOPMENT AND MEDICAL EDUCATION IN LIBERIA

2.1. Theoretical underpinnings

A curriculum represents the expression of educational ideas in practice and has been defined as “all the planned learning experiences of a school or educational institution” (Prideaux, 2003) take place. ‘Curriculum development’ then refers to the planning and implementation processes involved in developing or renewing a curriculum (Richard, 2001).

The medical education literature describes four main elements that need to be addressed in the process of curriculum development: content, teaching and learning strategies, assessment processes and evaluation processes (Prideaux, 2003). All modern thinking in this domain revolves around these components of curricula. Curriculum design, the process of defining and organizing these elements in a logical pattern, is the pillar of this framework.

In the present project, aimed at the development of a new medical education curriculum for the Dogliotti College, we refer to curriculum as the learning that is expected to take place during a course or programme of study in terms of knowledge, skills and attitudes; it specifies the main teaching, learning and assessment methods and indicates the learning resources required to support the effective delivery of the course.

This paragraph considers some of the theoretical underpinnings informing the curriculum development process conducted for the present study, thus contextualizing it in its domain of knowledge and providing the crucial aspects of the methodological framework adopted. In particular, the process drew upon the following theoretical concepts:

- Outcome-Based Education (OBE) and the associated concept of constructive alignment,
- scientific curriculum building,
- curricular cycle,
- curricular symbiosis,

and on the following methodological approaches:

- Johns Hopkins six-step approach,
- WHO educational handbook for health personnel.

Following the current trends in medical education towards more learner-centered and community oriented approaches (Harden *et al.*, 1984; Bligh *et al.*, 2001), a number of curriculum strategies have been devised and this challenge has led to different curriculum development models being employed. Among these, the ‘outcomes based education’ (OBE) has been highly influential and although there has been long debate over the nature and specificity of outcomes, objectives and competencies, there is now broad agreement that curricula should be defined in terms of what the learners should be able to achieve at any stage of education and training (Prideaux, 2000). Outcomes provide essential guidance about the level of learning required, the approaches to take when designing teaching and learning activities and, importantly, the way in which assessments should be designed to measure the extent to which the outcome has been achieved. Through the so called ‘constructive alignment’ of learning outcomes, teaching approaches and assessment methods, the curriculum is designed in order that the teaching and learning activities and the assessment tasks are aligned with the learning outcomes, thus supporting good student learning (Biggs, 1996) (Figure 1).

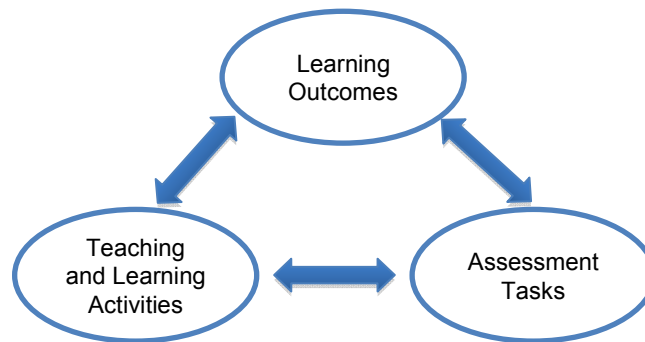


Figure 1. Constructive alignment between learning outcomes, learning and teaching activities and assessment (adapted from Biggs, 1996)

Among the various curriculum development theories, curricula of medical education are mainly structured along the principles of the scientific curriculum building, which advocates the use of the scientific method in order to determine what needs to be taught and to structure educational knowledge (Scott, 2008). According to this, the activities of experts are objectively examined, in order to derive a list of skills; these are broken down in constitutive elements; skills and elements are then melded into specific training objectives and the curriculum is designed around them. An appropriate evaluation is then designed in order to ensure that the learners have acquired the prescribed skills.

Drawing upon this scientific approach, a group of specialists at the Johns Hopkins University Faculty Development Program for Clinician-Educators has conceptualized medical curriculum design by following the principles of scientific curriculum building and has developed a rational curriculum design approach that is widely accepted (Kern *et al.*, 2009), their design (Figure 2). in six steps includes:

1. general situation analysis;
2. learning needs assessment;
3. formulation of goals and objectives;
4. choice of educational strategies;
5. implementation,
6. evaluation of learners and feedback.

This model represents a synthesis of various approaches characterizes by a cyclical structure, the so called ‘curricular cycle’ (Peyton, 1998), in which the steps do not follow one another in sequence, but constitute a dynamic, interactive, systematic and iterative process, in a cyclical arrangement which highlights the idea of interdependence between the steps.

Central to curriculum building, as envisaged by the Johns Hopkins group, is the general needs analysis and the assessment of the learners’ needs, which informs the other steps. Indeed, in contemporary medical education it is argued that curriculum design needs to reflect the educational, healthcare and professional context. In particular, the link between curricula and health care needs is promoted, arguing that the curriculum should achieve a ‘symbiosis’ with the health services and communities in which the future health personnel will serve (Bligh *et al.*, 2001).

The ‘curricular symbiosis’ between medical schools and health services will thus result in a mutual benefit. Ideally medical education should change as our knowledge base, needs – or perceived needs – of patients, medical practitioners and society change. Therefore, in order to ensure that the future doctors have the knowledge, skills and attitudes required by the communities they serve, medical curricula need to be responsive and dynamic (Figure 3).

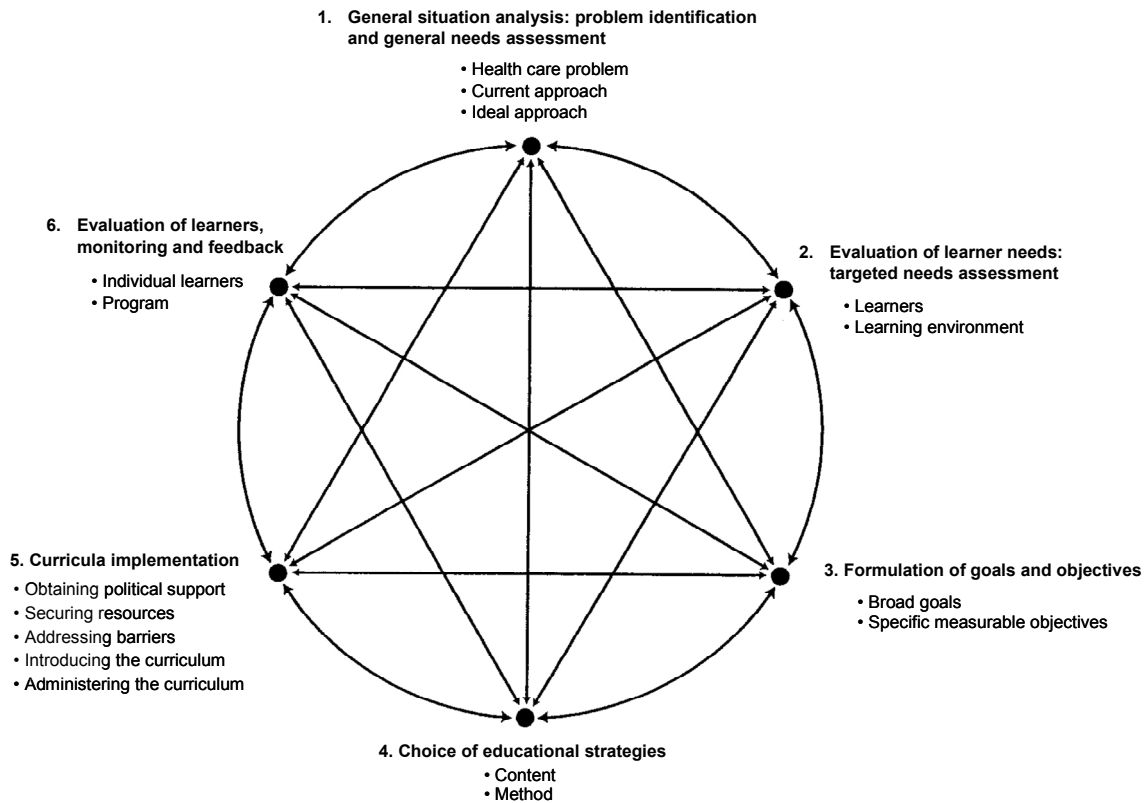


Figure 2. Johns Hopkins six-step approach to curriculum development (adapted from Kern et al., 2009)

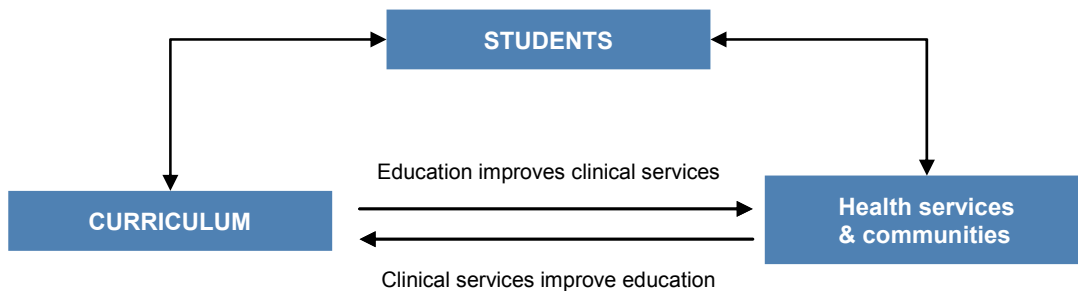


Figure 3. Symbiotic and dynamic curriculum

Similarly, the WHO (Guilbert, 1998) analysis of the relationship between health services and health education stresses the importance of the analysis of the health needs and of the professional functions, activities and tasks of the health personnel, in order to define educational objectives (Figure 4). According to this approach, there is a strong correspondence between professional acts and learning objectives, and the prior definition of professional tasks is the precondition for ensuring that training programmes are relevant to the needs of the population.

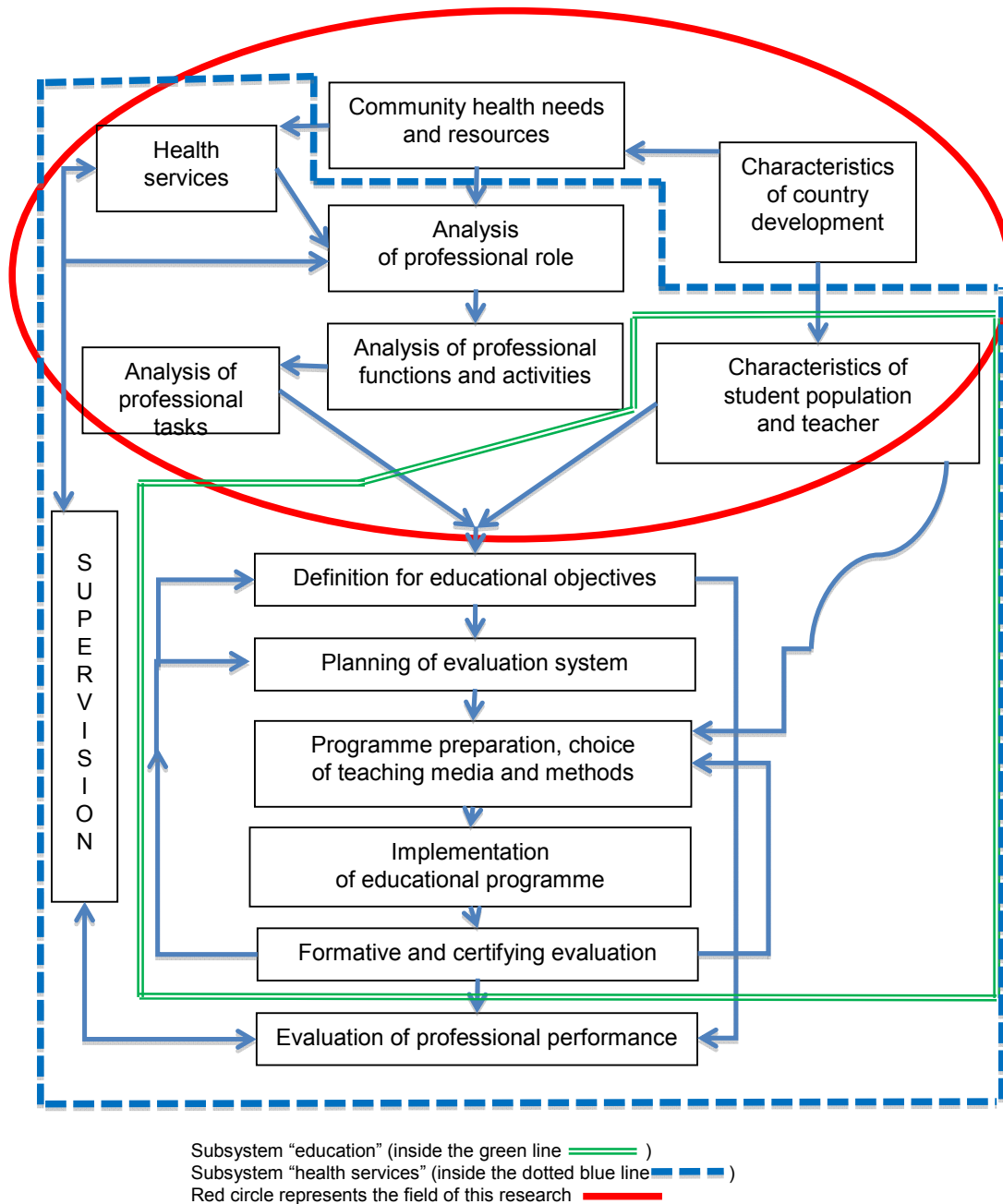


Figure 4. Organizational diagram showing the relationship between the subsystem "education" and the subsystem "health services". The red circle represents the field of this research (adapted from Guilbert, 1998)

To conclude, the act of preparing an effective curriculum provides an educator with a unique opportunity to consider, at the same time, the needs of patients, health-care providers and professionals and learners, as well as the interaction among them. A cycle of needs assessment, curriculum design, review and evaluation results in a curriculum that keeps pace with the evolving needs of all stakeholders. The careful alignment of aims, learning outcomes, teaching approaches

and assessment methods, which is inherent in excellent curriculum design, places educators in the best possible position to create an environment, which supports student learning.

All the above mentioned elements of education theory and trends in medical education curriculum design have all been taken into account and informed the present study’s approach for the development of the Dogliotti College new curriculum, providing the underpinning structure of the methodological framework elaborated and presented in the next paragraph.

2.2. Methodological framework

The methodological framework adopted for the development of a new curriculum for the Dogliotti College is characterised by a strong adherence to the scientific curriculum-making principles previously mentioned. Drawing upon the theoretical underpinnings already described, it is based mainly on an integration between two approaches: (1) the Johns Hopkins six-steps approach, which recognizes a general needs assessment and an assessment of learner needs as the basis for structuring the internal architecture of the whole process of medical curriculum design, and (2) the WHO Educational Handbook for Health Personnel (Guilbert, 1998), whose step-by-step method of curriculum planning stresses that the prior definition of ‘professional tasks’, as composed by practical, communication and intellectual skills, is a precondition for ensuring that training programmes are really designed to meet the population’s health needs. In particular, the entire process of curriculum review presented here was based on Guilbert’s assumption that professional tasks and educational objectives must be almost identical.

Figure 5 shows the correspondence between professional acts in the health field and educational objectives.

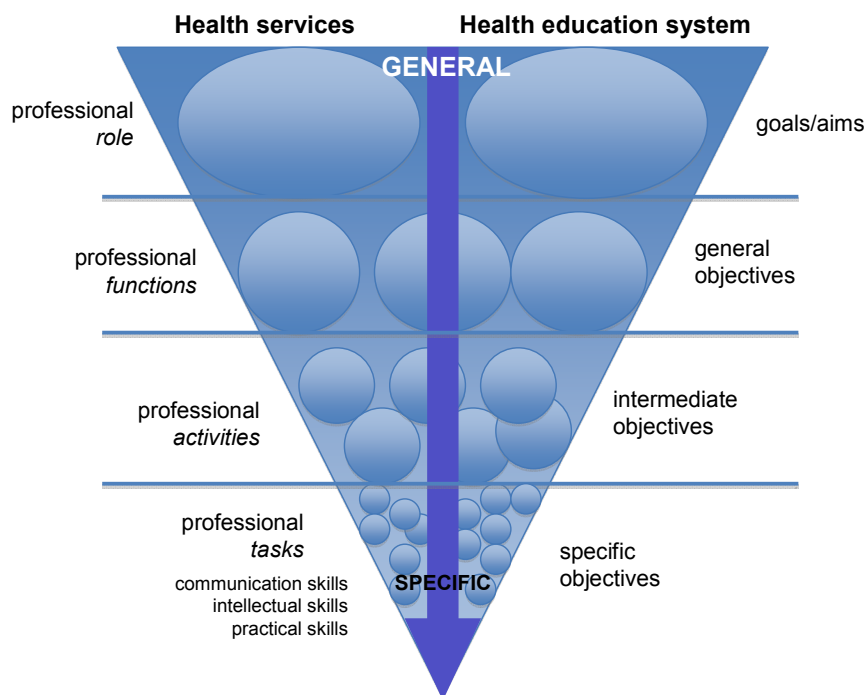


Figure 5. Relationship between professional acts in the health field and educational objectives (adapted from Guilbert, 1998)

The size of the circles relates to the number of objectives: the more specific they are the more numerous they are. The triangle indicates that at the general level, objectives are wide, broad, vague, while the specific objectives are punctual, narrow and precise.

In order to determine the essential components of professional competence, which should define educational objectives, the project foresaw the conduction of a task analysis. This method consists in a detailed task analysis of what the given categories of health personnel actually do, and in deriving from that list of tasks a statement of the knowledge and skills (what should be done, not merely what is being done) which they must have to perform competently.

Approaches to task analysis have been classified into three complementary categories: normative, descriptive and formative or predictive. Normative approaches “prescribe how a system should behave”, descriptive approaches “describe how a system actually works in practice”, and formative (also called predictive) approaches “specify the requirements that must be satisfied so that the system could behave in a new, desired way” (Kirwan & Ainsworth, 1992). For this project, as will be detailed later, we conducted both the descriptive and predictive task analysis.

According to the process we followed, after having established the principal functions that outline the role of a medical doctor in Liberia, we went on to achieve a greater degree of detail by describing the activities corresponding to each function, and went further to define each of the specific professional tasks corresponding to each activity. Through this process, we assured the relevance of educational planning for the Liberian medical doctors to be trained, by ensuring the correspondence between professional tasks and learning objectives of the Dogliotti College.

The methodological framework of the whole curriculum review process consists of three main phases:

1. Preparatory phase

Literature review and retrieving and analysis of West Africa regional medical curricula

Educational processes – from curriculum design to delivery and assessment – need to be based on sound teaching and learning practices and underpinning theories. Educational theories, as well as recent understandings of learning and trends in medical curriculum design, may impact on the design of courses and their delivery. Therefore, as a first step of the curriculum review process, a literature review on contemporary pedagogy and on education theory was conducted in order to analyse current trends in medical curriculum design as well as curriculum development models, with a special focus on the African context. These provided the crucial aspects of the methodological framework adopted.

Moreover, a review of medical curricula of neighbouring countries was conducted in order to identify key aspects and characteristics, specific for the regional contexts, and determine possible gold standards for the region. The research highlighted that since 2009 the West African Health Organization (WAHO), a specialized Economic Community of West African States (ECOWAS) institution, conducted several workshops aimed at the harmonization of General Medicine Training Curricula in the Anglophone, Francophone and Portuguese-speaking countries of ECOWAS. This Harmonized curriculum, available in the 3 ECOWAS languages, was then taken as the regional benchmark for the revision of the Dogliotti College curriculum.

2. Needs assessment phase

From situation analysis to training needs assessment

In order to base the process on empirical data about what competent and skilled Liberian doctors ought to know and ought to do in order to fulfil their functions and tasks, the activity foresaw an important need assessment component, from the general situation analysis to the evaluation of the student needs, which informed all other steps of the

process. On the basis of this comprehensive assessment, the goals and objectives of the course were formulated, covering the three domains of knowledge, skills and attitudes. This step was crucial for the selection of the most effective learning methods, as well as for the adequate choice of assessment modalities.

This phase was organised in different steps, each answering a specific research question through the use of several different techniques and tools:

- *STEP 1. What is there? The situation analysis*

This step foresaw the conduction of the following activities:

- A secondary data collection was carried out in order to describe the country's socio-economic and epidemiological situation in the period 2005-2010.
- An analysis of the current legislative and organisational framework of both the Liberian health professions, including the Liberian medical doctors' and other health workers' official job description, and the healthcare system was also carried out.

The result of this situation analysis was the identification of the country health needs and priorities as well as the details on the health services provided, the organization of the healthcare system and the Liberian health sector rules and regulations.

- *STEP 2. What is actually done? The descriptive task analysis of Liberian medical doctors*

In order to analyse the 'actual or real approach' to the medical profession and describe the functions, activities and tasks actually performed by the Liberian medical doctors, this step foresaw the conduction of the following activities:

- *Task analysis survey.* Quantitative data were collected through a questionnaire administered to 31 doctors from seven of the 15 counties, with the aim of collecting primary data on the actual competences and professional tasks of Liberian medical doctors at the different health system levels.
- *Focus Groups (FGs) with nurses and health personnel.* Qualitative data were collected in order to gather first-hand, well-informed perceptions on the tasks and relative competences that local medical doctors actually undertake and opinions on how medical doctors in Liberia perform their duties.
- *FGs with community members.* Qualitative data were collected with the aim of identifying beneficiaries' perceptions on professional medical services provided in Liberia and on the required and desirable improvements, thus obtaining a community informants' involvement in the process.
- *Stakeholders' interviews.* Structured qualitative individual interviews were conducted in order to identify tasks and relative competences that local medical doctors should have, as perceived by selected individuals with relevant institutional responsibilities in Liberia, thus obtaining the institutional informants' involvement.

These four separate activities have all contributed to gather relevant primary data on the actual situation of health services delivery and workforce organization in Liberia and contributed to the definition of the real professional tasks of medical doctors' which is the precondition for ensuring that training programmes are really designed to meet the population's health needs, as per the main study assumption stated above.

- *STEP 3. What should be done? The web-based predictive task analysis*

A panel of 15 selected international health and education experts conducted the Predictive Task analysis, or the analysis of the 'ideal, desired approach' to the medical profession. It was implemented through access to an ISS open source web

platform and complemented the collected empirical data with the experts' opinion on the practical, communication and intellectual skills needed for an appropriate performance of Liberian doctors' functions and activities, as derived from the prior definition of the professional tasks. As a result of this process, the Liberian doctors' needed knowledge and skills, on which the Training Need assessment was conducted, were jointly identified and validated, together with the corresponding learning outcomes for each professional task.

- *STEP 4: What is missing? The Training Needs Assessment*

On the basis of the knowledge and skills identified, a training needs assessment was conducted in order to identify the gaps, through the combination of the following tools and techniques:

- A Training Need Assessment (TNA) questionnaire aimed at assessing the Dogliotti College senior students and recent graduates competence needed for performing the professional tasks identified;
- FG discussions with senior students and teaching staff of the Dogliotti College aimed at gathering their opinions and experiences on the current training programme for the Liberian future doctors.

By evaluating the students' competences for the professional tasks (and relative learning outcomes) identified, the real training needs of the future Liberian medical doctors were determined.

The findings of this comprehensive needs assessment phase provided a complete and comprehensive framework for the development of a new curriculum for the Dogliotti College. As a result of the whole process, the review of the curriculum was conducted as follows.

3. Curriculum review and development phase

This phase was implemented by a team of Liberian and international experts in collaboration with the teaching staff of the College, through a series of workshops held in Monrovia and periods of distance work. In brief, the development of the new curriculum went through the following steps:

- Review of the old curriculum;
- Production of detailed Modules/Courses according to the shared Template;
- Writing of the Recommendation for the new curriculum implementation;
- Production of standardised Course Portfolios according to the Guidelines developed.
- During the process, seminars and laboratories on developing teaching methodologies, integrated modules and evaluation systems were provided.

As result of this process, the new medical curriculum for the Dogliotti College was developed by taking into account:

- the regional gold standard identified in the WAHO harmonised medical curriculum of the ECOWAS countries;
- the results of the needs assessment previously conducted;
- the College curriculum in force, with emphasis on the contents, on the training methodology, on student monitoring and evaluation system and on the College rules and regulation.

Figure 6 summarizes all the activities conducted in these three phases.

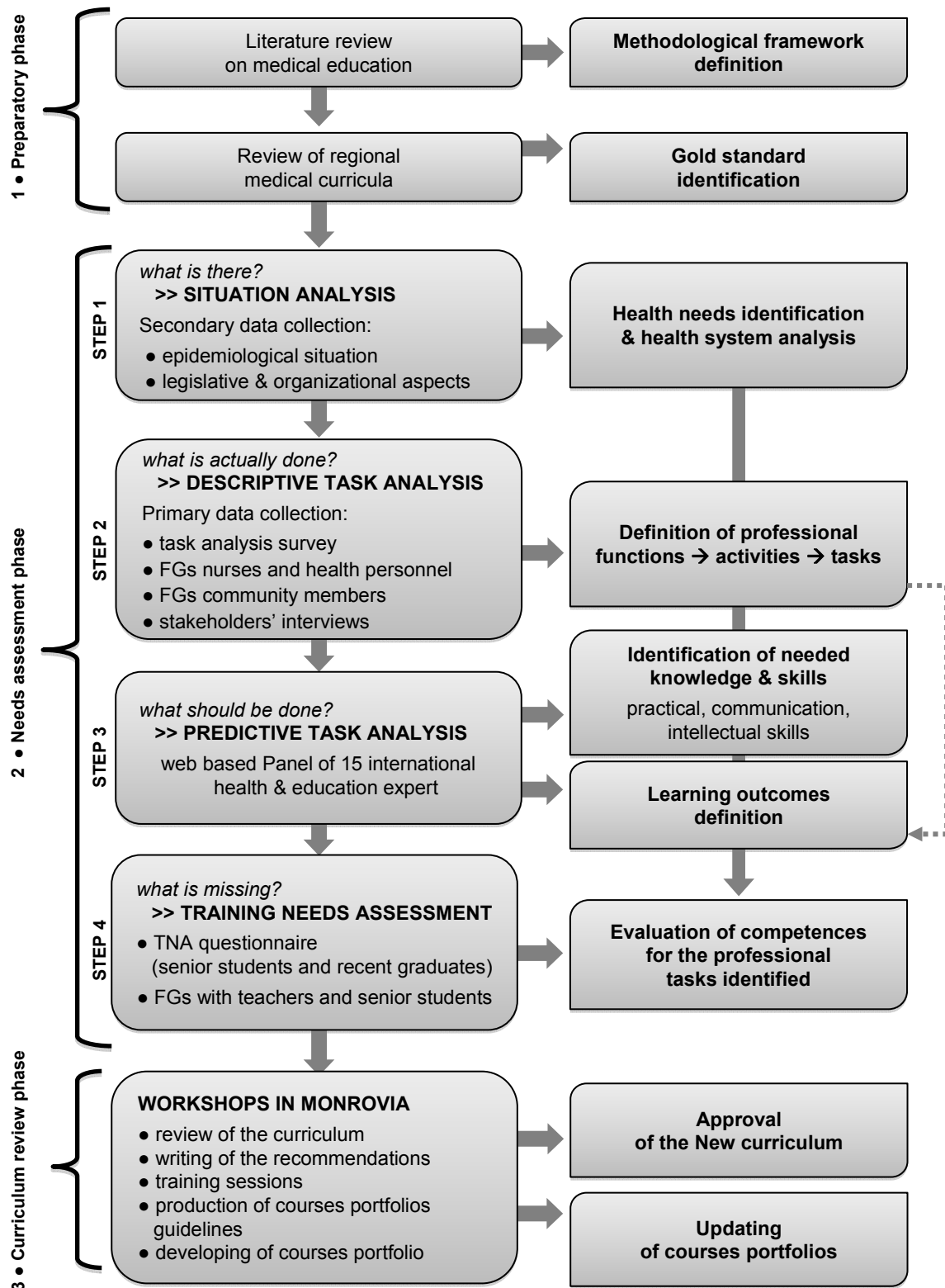


Figure 6. Project methodological framework: the three phases of the project and the main activities of the whole curriculum development process

3. DOGLIOTTI COLLEGE CURRICULUM DEVELOPMENT PROCESS

3.1. Study team

The whole process of curriculum development for the Dogliotti College was designed by ISS researchers, namely a medical doctor specialized in public health and two social-anthropologists – all with long experience in medical education, curriculum development and in health development projects – who coordinated all the phases of the project.

The study team for the different activities of the Preparatory and the Needs assessment phases, besides ISS researchers, was composed by:

- professors of the Department of Sociology of the University of Liberia;
- Liberian and international public health and training experts;
- *ad hoc* local teams for data collection.

The Curriculum review phase was then implemented by a team of Liberian and international professionals composed as follows:

- 7 international experts on curricula development, research methodologies, active learning methods, learning facilitation, communication, workshops and meetings management.
- 18 Liberian experts:
 - the Vice-Minister of the Ministry of Health and Social Welfare (MoHSW) & Chief Medical Officer of Liberia;
 - the Dogliotti College Dean;
 - the Heads of Department of the Dogliotti College;
 - Dogliotti College students' representatives.
- qualified observers:
 - the Liberian Ambassador in Italy;
 - representatives from NGOs.

3.2. Schedule of the project

The project was implemented according to the following steps:

1. Preparatory phase

Literature review and retrieving and analysis of West Africa regional medical curricula
(December 2009 - February 2010)

- Design of the methodological framework and development of the complete Study Protocol (March 2010)

2. Needs assessment phase

From situation analysis to training needs assessment
(April 2010 - August 2010)

- Development of the data collection instruments for each study
- Training of data collection teams
- Data collection and supervision
- Data analysis
- Writing of each activity's report.

3. Curriculum review phase

- Workshop I (13-24 September, 2010)
 - curriculum review and drafting of recommendations for its implementation;
 - drafting of guidelines for the training modules/courses.
- Workshop II (15-19 November, 2010)
 - finalizing the new curriculum and the recommendations;
 - finalising the production of the training modules/courses.
- Stakeholders meeting (3-13 December, 2010)
 - Presentation of the new approved curriculum and Recommendations
- Workshop III (7-12 March 2011)
 - Developing Guidelines for the production of Courses Portfolios
- Workshop IV (16-20 May 2011)
 - Monitoring standardised Course Portfolios' development
- Workshop V (16 September 2011)
 - Monitoring standardised Course Portfolios' development

The Ethical Committee of the Liberian Institute of Biomedical Research approved the Study Protocol and all the data collection instruments in May 2010. The Faculty (Academic) Senate of the University of Liberia approved the New curriculum in July 2011.

3.3. Phase 1: the literature review

During the Preparatory phase, the crucial aspects of the methodological framework adopted were identified through a literature review on contemporary pedagogy and on education theory which was conducted in order to analyse current trends in medical curriculum design and curriculum development models, with a special focus on the African context. Moreover, after a review of medical curricula of neighbouring countries, a regional gold standard was identified in the WAHO harmonised medical curriculum of the ECOWAS countries.

3.4. Phase 2: from the literature review to the needs assessment

For the implementation of the needs assessment (Phase 2 of the whole process), seven of the fifteen counties of Liberia were selected: Bong, Gbarpolu, Grand Bassa, Grand Cape Mount, Grand Gedeh, River Cess and Montserrado county (Figure 7). This selection was based on purposive sampling, taking into considerations seven factors: 1) population size; 2) availability of health facilities; 3) availability of medical doctors; 4) diversity in conditions of healthcare; 5) geographical diversity; 6) accessibility; and 7) the resources available for this study.

There are no major systematic differences among the seven counties and other areas/counties of Liberia. Before the war health services were slightly better in the studied area due to the presence of a private health sector. These private health facilities were supported by the health services in the rubber plantations; iron or mining companies, timber companies, agricultural development projects, missionaries, NGOs and other organizations. However, these health services were destroyed by the war in most parts of Liberia. The war itself did not affect the selected seven counties differently than other regions of the country in terms of health sector impact or other socio-economic population needs.

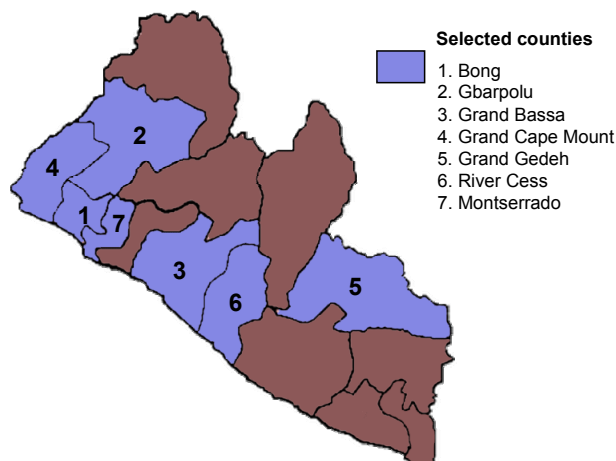


Figure 7. Map of Liberia with selected counties for the task analysis of Liberian doctors

As far as concerns the ethical aspects, professional ethical standards for applied research were vigilantly implemented throughout the data-collection and data-analysis process to ensure confidentiality and the utmost respect of the interviewees’ freewill and dignity.

The data collection was based on the freely given consent of the participants. Before each interview, the facilitator explained as fully as possible what the project was about, who was undertaking and financing it, why it was being undertaken and how the project results would be used. The interviewees were assured that at no time would their names or identities be disclosed. Also, they were allowed to stop the interview at any moment, if they so wished. All informants were required to sign a “confidentiality clause” before they could take part in the interview (“Confidentiality Clause” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>). Confidentiality was rigorously implemented during all the phases of the process. Table 4 below gives an overview of the implementation of Phase 2, including the research questions, objectives and tools used to conduct the need assessment.

Table 4. Phase 2 - Needs assessment: overview of the implementation

Research question	Step	Activity	Objective	Technique/ Tool
What is there?	1. Situation analysis	Analysis of the epidemiological, legislative and organizational framework for medical doctors and health services delivery (2005-2010)	To describe the epidemiological situation in 2005-2010	Secondary data collection
		Task analysis of medical doctors	To analyse the health system’s legislative and organizational framework	Desk review
What is actually done?	2. Descriptive task analysis	Task analysis of medical doctors	To identify the actual functions, activities and tasks performed by medical doctors	Questionnaire
		FGs with nurses and health personnel	To analyse opinions and perceptions of nurses and other on the tasks and relative competences of medical doctors	FG discussions
		FGs with community members	To analyse beneficiaries’ perceptions and opinions on the Liberian health services	FG discussions

to be continued

continues

Research question	Step	Activity	Objective	Technique/ Tool
		Stakeholders' interviews	To analyse opinions and perceptions of institutional stakeholders on tasks and functions performed	Structured qualitative interviews
What should be done?	3. Predictive task analysis	Web-based predictive task analysis	To identify Liberian doctors' needed knowledge and skills and the learning outcomes for each professional task	Web-based international experts' panel
What is missing?	4. Training needs assessment	Training needs assessment	To assess the senior students and recent graduates competence for conducting the professional tasks identified	Questionnaire
		FGs with senior students and teaching staff	To analyse opinions and experiences of students and teachers on the current training program for the Liberian future doctors	FG discussions

3.3.1. Step 1: situation analysis

This study, conducted by S.M. Ganawah and A.S. Aden with the two-fold aim of (a) describing the country's socio-economic and epidemiological situation and (b) analysing the current legislative and organisational framework of the Liberian healthcare system and health professions, was carried out through a secondary data collection on the following sources:

- *for the legislative and organizational framework:*
 - An Act Amending Part VII Chapter 61, of an act adopting a new public Health Law known as TITLE 33 of the Liberian code of Law as revised (1977) and in lieu thereof establishing a Liberian Medical and Dental Council to be Autonomous with exclusive power and Authority to regulate and monitor medical practice within the Republic of Liberia approved March 25th, 2010 (LMDC office, JFK Compound, Monrovia)
 - Core competence for Physicians Assistants revised October 2009
 - County Health Team Terms of Reference for core position, Assistant Minister for Curative Services (Moses Pewu, MoHSW)
 - Liberia National Gender Policy-Ministry of Gender and Development 2009
 - National Mental Health Policy
 - Nursing policy of Liberia, Nursing Division – MoHSW.
- *for the epidemiological situation:*
 - Annual Epidemiological Report on Diseases of Public Health Importance 2008
 - Situation Analysis of the Women Survivors of the 1989-2003 Armed Conflict in Liberia
 - Humanitarian Health Action Work in Liberia Annual Report 2008
 - Liberia Demographic and Health Survey 2007 (USAID Liberia)
 - National Strategy and policy for Community Health Services
 - National Health Policy and National Health Plan, MoH&SW 2009

- Report on the National Conference on the Review of the First Year of Implementation of the National Health Plan, MoHSW held on July 14-16 2008 at the Samuel K. Doe Sport Complex Monrovia.

Moreover, the information collected was discussed with public officers in relevant positions through the following interviews held in 2010:

- interview with Kelvin Momolu;
- interview with Dr. Moses K. Jeuronlon;
- interviews with Dr. Tabehe Freeman, Dean of Dogliotti College and with Dr. Moses Jeuronlon, opinion expert of functional health facilities in Liberia and national professional officer/WHO-Liberia HIV/AIDS, TB, Malaria;
- interview with Mrs Ellen George Williams, Coordinator Mental Health Unit, MoHSW;
- interview with Madam Musu Washington Actg. Chief Nursing Officer;
- interview with Dr Louise Kpoto, Program Director Epidemiology MoHSW.

For the description of the epidemiological situation the analysis focused on the most common diseases and causes of death, occurrences and the geographical distribution of diseases, population's nutritional status, maternal and child care initiatives, and mental illnesses/disabilities.

For the analysis of the legislative and organizational aspects of the health system and profession in Liberia, the study focused on the legal framework of the medical profession and for the health facilities, the official job descriptions of medical doctors and other health professionals (physician assistants, nurses and midwives) and the organization of the healthcare system.

Following the analysis of the above-mentioned documents and data, conclusions were drawn on the Liberian health needs and priorities, on the health services provided, the organization of the healthcare system and the Liberian health sector rules and regulations.

3.3.2. Step 2: descriptive task analysis

Descriptive approaches to task analysis “describe how a system actually works in practice”. In order to do so, in this project the Descriptive Task analysis was performed through the conduction of 4 activities: a task analysis survey, FG discussions with nurses and other health workers, FG discussions with community members, and individual interviews with stakeholders.

These four separate studies have all contributed to gather relevant primary data on the actual situation of health services delivery and workforce organization in Liberia and contributed to the definition of the real professional tasks of medical doctors' which is the precondition for ensuring that training programmes are really designed to meet the population's health needs, as per the main study assumption stated above.

3.3.2.1. Task analysis survey of Liberian medical doctors

This activity, coordinated *in loco* by Prof. Nicola Cozza, was based on quantitative data from a survey of 31 doctors, out of the 40 doctors targeted using a list provided by the MoHSW, in the seven counties selected on the basis of the criteria already described.

A convenience sample of doctors and accessible counties was used taking into account the project objectives, budget limitations and difficulties on transportation in Liberia. The sample was drawn mainly from hospitals, health centres and clinics in counties with a health situation suitable for generalization in the task analysis of medical doctors in Liberia. Respondents were drawn from a wide variety of the medical professional activities in Liberia. Three medical

doctors among the interviewed were female, twenty-eight male, twenty-two were interviewed in hospital, four in health centres and clinics, 5 in office administration.

Aim of the survey was the collection of primary data on the actual competences and professional tasks of Liberian medical doctors at the different health system levels (“Descriptive Task Analysis Questionnaire” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

Data analysis was conducted using Statistical Package for Social Sciences ver.17 (SPSS) and included descriptive statistics.

3.3.2.2. FGs with nurses and health personnel

A total number of ten FGs with health workers were conducted in the seven selected counties, with the aim of collecting first-hand, well-informed perceptions on the tasks and relative competences that local medical doctors actually undertake and opinions on how medical doctors in Liberia perform their duties.

Specific objectives of the FGs with health workers have been as follows:

1. to identify the tasks and relative competences that local medical doctors actually undertake;
2. to collect information on the quality, strengths and weaknesses of medical services in Liberia, from a suitable source: health professionals who are not medical doctors but are directly and constantly exposed to, and familiar with, the daily work of medical doctors.

At least one FG with health workers was held in each of the seven selected counties. In Montserrado (the county of the capital city Monrovia, where about half of the Liberian population lives) three FGs with health workers were held. In Bong, the second most populated county among the seven selected, two FGs were held.

Each FG was held with five informants: all of them were nurses, physician assistants, lab-technicians and midwives currently employed in recognized health facilities in the country. Informants were randomly selected in loco on the basis of their area of specialization (so to have a variety of professions represented in each FG), gender (no less than two informants, and no more than three, for each gender) and availability. Eventually, nurses represented the majority (62%) of the informants, followed by lab-technicians (18%), midwives (13%) and physician assistants (7%). The prevalence of nurses is in line with expectations, since nurses constitute the most numerous group within the health workers category.

The data collection team, composed of fifteen Liberian college graduates coordinated by Prof. Nicola Cozza, participated in an *ad hoc* training workshop (which included training on the project’s methodology and ethical standards) and took part in the field-test of the semi-structured questionnaire. A “facilitator” and a “note-taker” facilitated each FG (“FG Guidelines” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

The Questioning Route (a semi-structure questionnaire) was designed to facilitate an open and free discussion around five main issues: 1) role of medical doctors; 2) performance of medical doctors (diagnosis; treatment; surveillance and prevention; resource management; health education; inter-hospital collaboration; evaluation of personnel; training of personnel and team development); 3) main skills needed by medical doctors; 4) suggested changes in medical services and medical doctors’ behaviour; 5) comparisons with the past, with other clinics and between ‘old’ and ‘new’ medical doctors (“Questioning Route for Focus Groups with Nurses and other health workers” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

For each FG, two reports were prepared: a “Clean Transcript of the Discussion” with the contributions (comments, phrases, expressions and words) of each person participating in the FG; and a “FG Report”, containing the highlights of the discussion for each topic as well as participants’ attitudes and lessons learned for future FGs. For each topic or main issue, the contributions of all participants (reported in the “Clean Transcript of the Discussion”) were put

together, compiled and then analysed by looking for common responses, patterns and tendencies without discarding any individual contribution.

Afterwards, hypotheses were made as appropriate and assessed against the qualitative data collected. The “FG Reports” were used to strengthen and enrich analytical insights with participants’ attitudes towards the project in general and towards each debated issue in particular.

3.3.2.3. FGs with community members

A total number of seventeen FGs with community members were conducted with the aim of identifying beneficiaries’ perceptions on professional medical services provided in Liberia and on the required and desirable improvements.

The specific objectives of the FGs with community members have been as follows:

1. to identify beneficiaries’ perceptions on professional medical services provided in Liberia;
2. to collect primary data on beneficiaries’ perceptions on required and desirable improvements in medical services.

Two FGs with community members were held in each of the seven selected counties. The only exception was Montserrado County, where five of these FGs were held. This larger number is justified by the fact that Montserrado is the most populated county in Liberia: about half of the Liberian population lives here.

Each FG was held with six community members selected in loco on the basis of four criteria: 1) area of residence (only informants living within the catchment area of a recognised health facility were acceptable); 2) gender (three female and three male participants for each FG); 3) age group (it was required that the three age groups “young adults”, “adults” and “elders” were all represented in each FG); and 4) availability. The two FGs conducted in each of the visited county were held in different locations: one FG in the main city of the county (i.e. “the capital city” of the county), the other in a town of the same county. This choice was justified by the fact that “the capital city” of each county usually has better health facilities than the rest of the county. Therefore, collecting data both in the county’s capital and in a different town allowed to cover a wider range of experiences and to obtain a more accurate portrayal of beneficiaries’ perceptions on medical services.

The Questioning Route (a semi-structure questionnaire) was designed to facilitate an open and free discussion around three main issues: 1) performance of medical doctors (diagnosis; treatment; prevention; health education); 2) suggested changes and improvements needed in medical services; 3) identification of health priorities and suggested actions to address such priorities (“Questioning Route for Focus Groups with Community Informants” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

Data collection and analysis were performed as already described.

3.3.2.4. Stakeholders’ interviews

Twelve structured qualitative individual interviews with institutional informants were conducted in Monrovia by Prof. Aden, with the aim of identifying tasks and relative competences that local medical doctors should have, as perceived by selected individuals with relevant institutional responsibilities in Liberia.

The following twelve informants (seven male and five female) were purposively selected as individuals playing significant roles in medical services in Liberia: legislators (2), high-ranking staff of the Liberian MoHSW (4), experienced professors in medical sciences occupying top positions in the national university or in major hospitals (3), staff members of the WHO in Liberia (2) as well as a renown medical doctor and key member of the Liberian Dentist and

Medical Association (1). All key-informants are university graduates and seven of them are medical doctors. Out of the twelve interviewees, eleven have post-graduate degrees, including two doctorates.

The interviews were conducted by using a structured questionnaire with both close and open-ended questions on the participants' experiences and expectations concerning medical services in Liberia ("Institutional Informants Questionnaire" available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

The twelve compiled questionnaires were collected and analysed, looking for common responses, patterns and tendencies without discarding any individual contribution.

3.3.3. Step 3: predictive task analysis

3.3.3.1. Web-based predictive task analysis

Predictive approaches to task analysis "specify the requirements that must be satisfied so that the system could behave in a new, desired way".

In this study, a panel of 15 selected international health and education experts conducted the Predictive Task analysis, coordinated by ISS researcher Alice Fauci. Through a structured process, coordinated by ISS researchers and implemented through the ISS web platform, the study complemented the previously collected empirical data with the experts' opinion on the practical, communication and intellectual skills needed for an appropriate performance of Liberian doctors' functions and activities, as derived from the prior definition of the professional tasks. The international experts were selected according to the following criteria:

- previous experience in methodology of health training (previous experience in curricula development and training needs assessment was an asset);
- knowledge of the region or relevant experience in countries with a low level of income, or experiencing situations of post-emergency (previous experience in the region as health planner was an asset);
- previous international experience in primary health care and community health involvement (previous international experience in health services management was an asset);
- fluency and reporting skills in English (compulsory).

The predictive task analysis was conducted according to the following four steps:

1. *Reading the material from the primary and secondary data collection*

The experts were instructed to read the reports of the activities previously conducted on: 1) the epidemiological situation and the legislative and organizational framework; 2) the descriptive task analysis; 3) FG discussions with nurses and other professional health personnel; 4) on FG discussions with community members; 5) the institutional informants' involvement. Moreover, a table with a provisional list of functions and activities of the Liberian medical doctors was provided as a basis for discussion.

2. *Identifying communication, practical and intellectual skills per each activity*

On the basis of the above-mentioned material provided, the experts were instructed to identify the intellectual, practical and communication skills needed per each activity and to suggest other functions and other activities not already present in the questionnaire, if considered very important. In order to perform this step, a questionnaire was prepared by ISS researchers, listing the Functions and Activities for which the experts were asked to specify the intellectual, practical and communication skills needed and made accessible to the experts through the web platform ("Predictive Task Analysis Questionnaire" available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

3. *Defining Liberian medical doctors' knowledge and skills needed to perform their functions and activities*

ISS researchers harmonized the different experts' contributions into a document, which was the ISS proposal for the final definition of the knowledge and skills needed to perform Liberian medical doctors' functions and activities, on which the training need assessment was to be developed. Then, this document was made accessible to all the experts.

4. *Validating and ranking the Liberian medical doctors' knowledge and skills needed to perform their functions and activities*

The experts were asked to rank the functions and activities and to give a feedback or comments on the final list of knowledge and skills needed by Liberian medical doctors in order to perform their functions and activities.

3.3.4. Step 4: training needs assessment

On the basis of the knowledge and skills identified, a training needs assessment was conducted through the combination of the following quantitative and qualitative techniques: (a) a training needs assessment questionnaire and (b) a focus group with senior students and teaching staff of the Dogliotti College.

3.3.4.1. TNA Questionnaire

This activity was based on a semi-structured survey questionnaire administered in Monrovia to senior students and recent graduates of the Dogliotti College for collecting first-hand information on the type and quality of skills and knowledge that students acquire during their course of study at the medical college, with the final aim of identifying gaps in the competences of Dogliotti college students vis-à-vis standard medical curricula.

An *ad hoc* TNA questionnaire was developed, on the basis of the list of knowledge and skills identified through the Predictive Task analysis, by two international medical consultants, Dr Annalisa Trama and Dr Massimo Dieci, in collaboration with the project study team led by Prof. Nicola Cozza in Monrovia. The TNA questionnaire consisted of fifty-five questions divided in two sections ("Training Needs Assessment Questionnaire" available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>). The forty-nine questions of the first section were for both senior students of the Dogliotti College and medical doctors who recently graduated from the school and referred to skills and knowledge needed to successfully implement seven functions, normally performed by medical doctors in their work: 1) diagnosis; 2) treatment; 3) surgery; 4) child and maternal care; 5) reproductive health; 6) community medicine; 7) health centre management. In addition, nine more questions were added on skills and knowledge that, although important, could not be directly assigned to any of the mentioned functions: from skills in psychiatry and communication, to knowledge of medical ethical standards and Internet tools. All questions of the first section asked: "To what extent the training at the Dogliotti College teaches them to perform a certain task X" and required the respondents to answer by selecting among seven options. The second section (questions 50 to 55) focused on working experience as medical doctor and was administered only to recent graduates of the Dogliotti College and contained questions that required non-standardized, open answers.

The TNA questionnaire was aimed at three types of respondents: 1) students enrolled in the fourth year of the course in medical studies of the Dogliotti College; 2) students enrolled in the fifth year (the last year of course) of the Dogliotti College; 3) medical doctors who graduated from Dogliotti College in 2009. Due to their relatively small number as compared to the amount

of questionnaire forms to be administered (the target was 50 filled forms), all individuals belonging to these three categories were allowed to take part in the TNA questionnaire. The final number of interviewees for each group was determined by their availability to take part in the TNA. Table 5 shows the number of respondents to the TNA questionnaire as well as the total population for each of the three types of respondents.

Table 5. Type and number of respondents to the TNA questionnaire on the total population

Type of participants	Number of participants	Total population
Students of the 4 th year	27	33
Students of the 5 th year	11	13
Graduated in 2009	13	14
Total	51	60

A team of fifteen enumerators – all Liberian, non-medical graduates – participated in two ad hoc training workshops, which included training on the objectives, methodology and ethical standards of the project, as well as specific training on the TNA questionnaire.

During the data collection, each informant's answers were directly recorded on the questionnaire form. The field supervisor reviewed each questionnaire form immediately after the completion of the interview, asking the data-collector for any clarification as deemed appropriate, before submitting the form to the principal investigators. At the end of the data collection process, all answers recorded in the filled questionnaire forms were entered into two computerized tables using Microsoft Excel. The entered data were controlled for misreading and typing errors. Afterwards, all data from the first section of the questionnaire forms were analysed to produce accurate descriptive statistics. Also, statistical tests were carried out that would reveal the existence of significant differences between the three groups of respondents (fourth year students, fifth year students and recent graduates).

As for the data of the second section of the questionnaire forms, these were separately compiled and analysed by looking for common responses, patterns and tendencies without discarding any individual contribution, due to their prevailing qualitative character. When appropriate, they made hypotheses and assessed them against the data collected.

3.3.4.2. FGs with teachers and senior students

Four FGs were held with enrolled students and teaching staff of the Dogliotti College with the aim of collecting opinions and experiences of students and professors in order to:

1. Identify the difficulties and expectations of students and teachers of the Dogliotti College *vis-à-vis* the present curriculum of this institution;
2. Collect primary information on the strengths and weaknesses of the current training program for medical students in Liberia.

Each FG with students was held with five informants: all of them were graduates (holders of a Bachelor Degree in Science, B.Sc., from a recognized university) and enrolled in either the fourth (two FGs) or fifth year (one FG) of the course of medical studies of the Dogliotti College. It is important to note that, since 2002, having a B.Sc. in Biology, Zoology or Chemistry (with a minor in any of the other two disciplines) has been an essential requirement for admission to the Dogliotti College. The FG with teaching staff of the College had seven participants: all of them were not only teaching professors but also heads of department at the Dogliotti College. At the time when the FG took place, four participants were heading pre-clinical departments while three were in charge of clinical ones.

The students that participated in the FGs were selected *in loco* on the basis of their availability and their gender (no less than two informants, and no more than three, for each gender) (Table 6). With regard to the selection of the teaching staff, this was carried out on the basis of availability and area of teaching: the aim was to have a balanced representation of both pre-clinical and clinical courses.

Table 6. Type and number of participants to the focus group discussions

Focus group	Type of participants	Number of participants by sex		
		Male	Female	Total
FG 1	Senior students (4 th year)	2	3	5
FG 2	Senior students (4 th year)	3	2	5
FG 3	Senior students (5 th year)	2	3	5
	Total students	7	8	15
FG4	Teaching staff (4 pre-clinical and 3 clinical)	6	1	7
	Grand total	13	9	22

Two Questioning Routes (a semi-structure questionnaires), one for the FGs with students and one for the FG with teaching staff, were designed to facilitate an open and free discussion around the following key topics, all of them concerning different aspects of the course of studies in medicine of the Dogliotti College: 1) teaching methods; 2) student evaluation system; 3) number and type of courses required; 4) important skills & knowledge currently not provided; 5) desirable changes in the current curriculum; 6) length of time required to become a medical doctor; 7) main challenges experienced by students/teachers (“Questioning Route for Focus Groups with Students and Teachers” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

FG data collection and analysis were conducted as previously detailed.

3.4. Phase 3: curriculum review and development

The review of the old – and the development of the new – curriculum for the Dogliotti College was implemented through a series of workshops held in Monrovia, followed by periods of distance work, by national and international experts in collaboration with the teaching staff of the College. The process, coordinated by the Head of the Project with Prof. Z’ Sherman Adams, Jr. and Dr Alfonso Mazzaccara, in collaboration with the Dogliotti College Dean Prof Freeman and Prof G. Tarsitani, can be summarised as follows:

- *Workshop I (September 2010)*
 - curriculum review (on the basis of the results of the activities conducted during the Preparatory and the Needs assessment phases)
 - Drafting of recommendations for its implementation;
 - Drafting of guidelines for the courses development (“Module Template” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>)
- *Workshop II (November 2010)*
 - Seminars on teaching methodologies, community based medicine and traditional medicine;
 - Finalizing the new curriculum and the recommendations;
 - Finalising the production of the courses.

- *Stakeholders meeting (December 2010)*
 - Presentation of the new approved curriculum and recommendations.
- *Workshop III (March 2011)*
 - Seminars and laboratories on developing teaching methodologies, integrated modules and evaluation systems;
 - Working groups for the production of educational material for four Modules: 1 preclinical, 1 clinical, 1 surgery, 1 public health;
 - Developing Guidelines for the production of courses portfolios.
- *Workshop IV (May 2011)*
 - Monitoring standardised Course Portfolios' development
- *Workshop V (September 2011)*
 - Monitoring standardised Course Portfolios' development
- *Approval of the New curriculum by the Academic Senate of the University of Liberia in July 2011.*

3.5. Results of the curriculum development process

As a result of the whole process described, the Dogliotti College New curriculum was developed by taking into account: 1) the regional gold standard identified in the WAHO Harmonized medical curriculum of the ECOWAS countries; 2) the results of the needs assessment conducted; 3) the characteristics of the College curriculum in force.

The new medical curriculum was approved by the Academic Senate of the University of Liberia in July 2011 and applied during the Academic Year 2011-2012 for the 1st and 3rd year courses, during the Academic Year 2012-2013 for the 2nd and 4th year courses and during the Academic Year 2013-2014 for the 5th year courses (“Dogliotti College New curriculum (Part 1 and Part 2” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

Moreover, while the agreed solutions to many standing problems identified led to the development of the New curriculum, the agreed solution to specific training needs led to the conduction of workshops, seminars and laboratories on course planning, teaching methodology, integrated modules and evaluation systems. Finally, the guidelines for the production of standardized course portfolio have been issued and the portfolio of each course partially updated accordingly (“Portfolio Development: A Guideline” available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>).

This paragraph presents the results of the process of curriculum development for the Dogliotti College, by dividing them into two parts: the first will highlight the key findings of the Preparatory and Needs assessment Phases in terms of needs and priority to be addressed while reviewing the curriculum; the second will focus on the New curriculum, emphasizing the changes made in order to answer to the needs and priorities previously identified.

3.5.1. Key findings of the Preparatory and Needs assessment phases

The literature review on contemporary pedagogy and on education theory was conducted during the Preparatory Phase in order to analyse current trends in medical curriculum design as well as curriculum development models, with a special focus on the West African context.

The review of medical curricula of neighbouring countries highlighted that in the West African region the training curricula are obsolete, unsuitable and un-harmonized from one

country to the other and often from one university to another within the same country. However, since 2009 the WAHO, a specialized ECOWAS institution, supported the harmonization of General Medicine Training Curricula in the Anglophone, Francophone and Portuguese-speaking countries of ECOWAS. The process of developing a suitable consensual curriculum for the region in terms of nomenclature, duration of studies, training objectives, programs content (modules and credits), registration and evaluation criteria was finalized and a set of criteria and a consensual matrix of accredited training for General Practitioners in the West African Sub-Region was agreed upon. This Harmonized curriculum for Undergraduate Medical Training in the ECOWAS Region (hereafter WAHO Harmonized curriculum), available in the 3 ECOWAS languages, was then taken as the regional gold standard for the revision of the Dogliotti College curriculum.

The Harmonised curriculum, whose design is based on the traditional pattern of 2 years of basic science education followed by 3 or 4 years of clinical rotation, laid particular emphasis on the following:

- The curriculum content was designed in a flexible and dynamic way taking into account contributions and specialties of different language blocs. It laid emphasis on regionally and globally relevant medical education, with a strong community orientation. It also gave particular attention to medical ethics, medical informatics, managerial skills, evidence-based medicine, traditional medicine and competence in at least two official languages of ECOWAS.
- The curriculum delivery promoted self-directed learning and life-long learning in order to maintain and update the acquired competences.

The situation analysis confirmed that the most urgent public health priorities are communicable diseases like malaria, tuberculosis and HIV/AIDS, maternal and child health, childhood diseases, mental health, sexual violence and disabilities.

The legal framework of the health system and profession is comparable to other countries in the region but fails to account and monitor for best practice code of conduct for medical doctors in the country, despite the establishment, in 2010, of the Liberian Medical and Dental Council (LMDC) as an autonomous and exclusive authority to regulate and monitor medical practice. Indeed, the ethical codes for medical services are quite in place but are being poorly implemented and managed due to inadequate supervision, leadership and training. The official job descriptions for medical doctors and health workers are proper, though not much detailed, but present a challenge of coordination and accountability for their work, probably because the required training and other logistical support may not be available or are inconsistent with their Terms Of Reference (TORs) or their assigned duties. Very few Liberian medical doctors are employed by the Government, while the majority works in private health facilities and NGOs. Most Liberian health workers and practitioners (nurses, traditional healers, midwives, etc.) are practically trained and graduated from unrecognized health institutions and perform their duties unsupervised and / or in health facilities that do not meet basic health minimum standards.

As for the organization of the health system, the Liberia functional health facilities are:

- *Hospital*, the major health facility fully capacitated with qualified competent medical doctors and other health practitioners with specialized designations to meet and provide services to all major medical related cases with improved managed care utility, logistical-diagnostic and medical interventions, prescriptions, medications alternative available. Thus a medical doctor is required to attend to a minimum caseload as need be.
- *Health Centre*, defined as and depending on the level/locality/calibre of utility and types of health personnel(s) available to provide a minimum health delivery services which is not limited to diagnosis and primary health care services. Usually a medical doctor is assigned and/or proxy service is utilized by a physician assistant. Most rural health centres have little or no access to modern labs or competent health care practitioners.

- *Clinics*, not well defined in Liberia's health care delivery system, both theoretically and practically. When operational, clinics are usually crowded, under-sourced and chaotic, except a few funded by different donors. All kinds of health workers associated with health delivery services (medical doctors, nurses, midwives, physician assistants, etc.) take assignment at different clinics across the country. Here, supervision and coordination of services are literally non-existent. All across Liberia, lower health care practitioners, such as physician assistants, midwives, nurses, nurse-aide and other non-medical practitioners, directly run several clinics.
- *Other healthcare facilities*, such as Community health post, mainly utilized by lower healthcare practitioners and traditional healers. There is no known conventional routine associated with this health care delivery services. What seems interesting is that many community members solicit health needs from their healers in these health posts. Most importantly, hospitals and other health care practitioners randomly make referral to the healers of those facilities for several conditions, which they feel cannot be handled with their competences or by their own health facilities.

It is not known how these facilities are coordinated and/or managed under the Liberian health policy. What is clear is that functionality of health facilities is a practical contextual reality in Liberia, where the health system still faces the big challenge of bridging the rural health delivery gap, with a chronic shortage of health facilities, equipment and medicine in the rural areas. Liberia's efforts to rebuild the health system are further limited by a low health budget, which makes it highly dependent on donor assistance.

In brief, the skeletal official job descriptions for medical doctors and health workers, the poor pay schemes, the lack of proper coordination among the health care practitioners and institutions, the existence of unrecognized and poor quality training institutions, the ill equipped health facilities and non-specialized and non-supervised practices by medical doctors or managed care services and the deficiencies in the professional responsibility system, all contribute to the alarming health situation in the country.

The descriptive task analysis highlighted that the routine medical duties of medical doctors in Liberia are generally related to clinical diagnosis and treatment. Clinical diagnosis is done using basic medical equipment such as stethoscope, sphygmomanometer and otoscope, X-ray, electrocardiogram; often laboratory tests are not performed because of the lack of such equipment and/or devices. Treatment includes medical and surgical interventions (managing surgical stitches and performing minor operation) as well as maternal and child care activities.

Although medical doctors should be involved in preventive and communicable diseases control activities, including health education, immunization campaign, outbreak investigations, epidemiological surveillance with case detection and reporting, in reality their duties are mainly related to clinical diagnosis and treatment and they are rarely involved in preventive and health education campaign at population level. Education activities are limited to one-to-one discussion during the medical visit. Similarly, while their duties includes the organization and management of the healthcare services including supervision and training of the healthcare staff and the referral and coordination with other health and social services, actually medical doctors are rarely involved in the management of the health care service and they dedicate very limited or no time to training and supervision of the health workers.

The main criticisms identified by the whole process with reference to the medical doctors competencies and performances are the lack of specializations (ophthalmology, orthopaedics, psychiatry) and especially the limited surgical skills. Teamwork capacities, as well as supervisory skills and communication skills, are also very scarce, thus undermining the relationship with the health workers and with the patients. Finally, medical doctors in Liberia work in a very difficult context: high workload, lack of equipment, lack of drugs and medicine, and poor salaries.

The training need assessment, including the FGs, pointed out several areas of weakness in the current medical training of the Dogliotti College.

These are organized and presented below in terms of what are considered to be the main elements to be addressed in the process of curriculum development:

- *Content and organization of the academic program*
 - Need for greater coordination and integration among courses;
 - Content of courses generally poor and not updated;
 - Unbalanced distribution of subjects and tasks both between and within the different course years, with a particular overload during the Fourth Year;
 - Need for strengthening basic surgical skills and for developing operational and practical skills in emergency medicine, anaesthesiology, orthopaedics and dentistry;
 - Need for developing training in psychology, psychiatry and mental health problems management;
 - Insufficient training hours in Obstetrics/Gynaecology;
 - Need to increase training in Haematology, Pathology and Microbiology and enhance laboratory practice in Physiology, Microbiology and Anatomy and modern diagnostic equipment;
 - Excessive emphasis perceived on Public Health, at the expense of subjects such as Pharmacology, Haematology, Pathology and Microbiology;
 - Lack of focus on Traditional Medicine;
 - Need to develop computer literacy;
 - Need to strengthen training in ethics in the medical practice;
 - Need to improve the acquisitions of better communication and managerial skills for the Liberian future doctors;
 - Excessive length of time required (at least 9 years after high school) to become a medical doctor due to the Dogliotti College entrance requirement of a Bachelor of Science, which is normally awarded after four or five years of undergraduate study.
- *Teaching and learning strategies*
 - Main teaching methodology used is the lecture while no tutorials nor other teaching methods are used;
 - Poor interaction between teachers and students;
 - Old and out-dated teaching materials and equipment;
 - Lack of teachers' training opportunities;
 - Absence of set and standardized teaching standards;
 - Teachers' limited commitment to teaching due to low salaries and consequent need of additional income from other jobs at public or, more often, private health facilities;
 - Lack of teaching staff, with the resulting excessive workload on current teachers;
 - Poor supervision of students during the clinical practice at JFK Hospital, due to the lack of a written agreement between the two institutions, which contribute to undermine the quality and usefulness of students' clinical practice.
- *Assessment and evaluation processes*
 - Absence of a framework for the systematic evaluation of merit, worth, and significance of training, and in detail:
 - Lack of clearly set standards, procedures and criteria for evaluation of students' performance.
 - Existence of a variety of students' evaluation methods in use, whose effectiveness is dubious.
 - Lack of control of evaluation procedures from independent authorities.

- Discrepancies about topics taught in class and topics asked in the exams.
- System easily exposed to favouritism and malpractices.
- Total absence of procedures to evaluate teachers' performance and courses.

To conclude, the results of the Needs assessment phase, through the identification of the shortcomings of the medical doctors' skills for answering the population health needs, the analysis of the deficiencies of the curriculum in force and the training needs of the students and future doctors, gave evidence of the necessity to develop a new curriculum for the Dogliotti College.

The team of international and national experts who reviewed the curriculum in collaboration with the Dogliotti College staff, then addressed the major needs and priorities identified, having as a gold standard the WAHO Harmonised curriculum.

3.5.2. Results of the Curriculum review phase

Tables 7 and 8 describe the main characteristics of the new revised curriculum, by indicating for each year's course: subjects included, number of credits and hours allocated and whether it is an integrated course.

Table 7. PRE-CLINICAL DIVISION: main characteristics of the Dogliotti College new curriculum

YEAR	Course	Description	Credits	Hours			INT	
				Tot.	T20	P40		I40
1	1st semester							
	Introduction to medicine	Basic IT, communication skills (writing), ethics, history & basic concepts of community medicine	8	160	32	64	64	Y
	Embryology-histology 1	Embryology, histology	5	100	20	40	40	N
	Genetics and Cell-Biology	Medical genetics, cell-biology	5	100	20	40	40	N
	Anatomy 1	Human anatomy, radiology (imaging) introduction	12	240	48	96	96	Y
	Physiology 1	General physiology	6	120	24	48	48	N
	2nd semester							
	Anatomy 2	Human anatomy	12	240	48	96	96	N
	Physiology 2	Systemic physiology	7	140	28	56	56	N
	Embryology-histology 2	Embryology, histology	5	100	20	40	40	N
	Medical biochemistry 1	General biochemistry	7	140	28	56	56	N
Community medicine 1	Introduction to epidemiology, medical sociology, anthropology, demography, communication skills	7	140	28	56	56	Y	

to be continued

continues

YEAR	Course	Description	Credits	Hours			INT	
				Tot.	T20	P40		I40
2	1st semester							
	Medical biochemistry 2	Metabolism and nutritional biochemistry	8	160	32	64	64	N
	Pharmacology 1	General pharmacology	6	120	24	48	48	N
	Neurosciences 1	Neurosciences (neuro-anatomy, neuro-physiology, neuro-pharmacology, neuro-biochemistry)	11	220	44	88	88	Y
	Neurosciences 2	Neurosciences (neuro-anatomy, neuro-physiology, neuro-pharmacology, neuro-biochemistry)	11	220	44	88	88	Y
	2nd semester							
	Pharmacology 2	Systemic pharmacology	9	180	36	72	72	N
	Bio-statistics	Bio-statistics, epidemiology methods and concepts	8	160	32	64	64	Y
Community Medicine 2	Disease control & prevention; environmental health (echohealth/sanitation/ecology)	8	160	32	64	64	Y	
Laboratory medicine 1	General pathology, basic haematology & clinical chemistry, immunology, molecular biology & general medical microbiology	12	240	48	96	96	Y	

C: Credits; T20: Theory20%; P40; Practical 40%; I40; Individual 40%; INT: Integrated. Y: yes; N, no

Table 8. CLINICAL DIVISION: main characteristics of the Dogliotti College new curriculum

YEAR	Course	Description	Credits	Hours			INT	
				Tot.	T20	P40		I40
3	1st semester							
	Laboratory medicine 2a	Chemical pathology, haematology/blood transfusion	9	180	36	108	36	Y
	Laboratory medicine 2b	Anatomical pathology & medical microbiology, parasitology & virology	10	200	40	120	40	Y
	Clinical & nursing skills	Communication skills, Introduction to history taken & patient physical examination	11	220	44	132	44	Y
	Community medicine 3	Epidemiological & research methods for community diagnosis, rural posting	8	160	32	96	32	Y
	2nd semester							
	Medicine 1a	Infectious diseases, pulmonology, gastroenterology/herpetology	12	240	48	144	48	Y
	Surgery 1a	Surgical pathology, surgical signs and symptoms, introduction to clinical radiology	12	240	48	144	48	Y
Paediatrics 1	Health nutrition	6	120	24	72	24	N	
OBGYN1	Family & reproductive health	8	160	32	96	32	N	

to be continued

continues

YEAR	Course	Description	Credits	Hours			INT	
				Tot.	T20	P40		I40
4	1st semester							
	Medicine 1b	Cardiology, nephrology, medical emergencies	9	180	36	108	36	Y
	Medicine 2a	Psychiatry 1, neurology, oncology	11	220	44	132	44	Y
	Surgery 1b	General surgery, surgical emergencies	9	180	36	108	36	N
	Paediatrics 2	Paediatrics	10	200	40	120	40	N
	2nd semester							
	Surgery 2a	Orthopaedics & traumatology, sports medicine, physiotherapy	9	180	36	108	36	Y
	Medicine 2b	Endocrinology, rheumatology and immunology, disorders	8	160	32	96	32	Y
OBGYN2	Gynaecology, reproduction, family planning & menopause	13	260	52	156	52	Y	
Student elective	New course	4	80	16	48	16	-	
5	1st semester							
	Community medicine 4	Rural posting, PHC, occupational medicine	13	260	52	156	52	Y
	Medicine 3	Dermatology & STI, psychiatry 2	9	180	36	108	36	Y
	Surgery 3	ORL, dentistry, ophthalmology, anaesthesia, urology, cardiothoracic & neurosurgery, paediatric surgery	11	220	44	132	44	Y
	Ethics/jurisprudence forensic medicine	Jurisprudence, forensic medicine	3	60	12	36	12	N
	2nd semester							
	Management & communication skills	Health planning, management & communication skills	6	120	24	72	24	Y
	Medicine 4	Toxicology & related disorders, therapeutics, chronic care & gerontology	10	200	40	120	40	Y
Surgery 4	Surgical emergencies 2, surgical oncology	9	180	36	108	36	Y	
Community medicine 5	Project, global health issues, health systems (including alternative) & economics	10	200	40	120	40	Y	

C: Credits; T20: Theory20%; P40; Practical 40%; I40; Individual 40%; INT: Integrated. Y: yes; N, no

In general, it can be noticed that the curriculum design apparently maintained the traditional Pre-clinical and Clinical division thus separating the underpinning 'science' from clinical medicine and a mainly discipline-based approach. In reality, the overarching curriculum transcended traditional subject boundaries through the creation of several integrated courses in which teaching units from subject disciplines are taught together. Moreover, the credit system has been linked to the hours allocated to each Course (1 credit = 20 hours), divided into theory, practice and individual study hours as follows: 20%, 40% and 40% respectively for pre-clinical courses and 20%, 60% and 20% respectively for clinical courses.

A brief summary of the main changes made in the new curriculum follows in order to answer to the main needs and priorities identified.

As for the content and organization of the academic program, in general the whole process highlighted the need for a more coordinated & skill-oriented academic program, with up-to-date contents and a more balanced distribution of subjects and tasks both between and within the course years. Therefore, the main changes made in the new curriculum during the Review phase are relative to: 1) the introduction of several integrated courses (25 out of 42 courses) and the institution of a person in charge of each Academic Year who, together with the existing pre-clinical and clinical coordinators, monitors the harmonization of the different courses and avoid overlapping of subjects; 2) the fulfilment of the WAHO curriculum recommendation of foreseeing 40% of practice hours of the total study hours and only 20% of theoretical teaching hours and 40% of individual study for pre-clinical courses, increased to 60% of practical hours and 20% of practice and 20% of individual study hours for clinical subjects; 3) the development of detailed standardized Courses Portfolio for updating the contents of the courses, including the evaluation strategy; 4) the increase of hours foreseen for some subjects and the re-organization of the courses foreseen for the 3rd, 4th and 5th years in order to balance the 'overload' of the 4th year, thus dividing the curriculum in a two- year preclinical Division and a three-year Clinical Division. In particular:

- In order to strengthen basic surgical skills, the total hours for Surgery were increased from 400 hours in the Old curriculum to 600 hours in the New curriculum, thus aligning with the WAHO Harmonised curriculum standard of 570 hours; moreover, with the creation of integrated courses of Surgery, the subject was better distributed along the 5 semesters of the Clinical Division.
- In order to improve training in diagnosis and treatment of psychiatric illness, Psychiatry, previously existing as a standing-alone discipline, was included in two integrated courses: Medicine 2a (together with Neurology and Endocrinology) and Medicine 3 (together with Dermatology and Sexually Transmitted Diseases). By allowing the contemporaneous study of akin subjects, the correlation between the signs and symptoms of different pathologies and possible therapeutic treatments is facilitated.
- In order to improve training in Obstetrics/Gynaecology, the hours dedicated to these subjects were set at 420 hours in the New curriculum, thus aligning with the harmonised curriculum standard of 480 hours. Moreover, the core curriculum integrated biomedical basic science knowledge with its application to clinical practice in order to provide students with the necessary information to develop a core understanding of the clinical manifestations of common diseases, including risk factors, prevention, clinical presentation, clinical course, treatment and prognosis.
- In order to enhance training in subjects such Haematology, Pathology and Microbiology, and improve the laboratory practice and use of modern diagnostic equipment, it was created the integrated courses of Laboratory Medicine 1, 2a and 2b which included these subjects; at the same time, the project employed professors of Pathology, Biochemistry, Anatomy and Physiology.
- In order to answer to the perceived excessive emphasis on Public Health at the expenses of other subjects such as Pharmacology and Biochemistry, the hours of these latter subjects were increased (from 240 to 300 each) while Public Health was substituted with the integrated courses of Community Medicine, giving the curriculum a strong community oriented approach as required by WAHO curriculum recommendations and by current international and African medical educations trends. Moreover, seminars were held in Monrovia on Community Based Medicine.

- Following the WAHO curriculum, seminars on Traditional medicine were held and this previously absent subject was included in the integrated course of Community Medicine of the new curriculum.
- A new integrated course of Introduction to Medicine was created,, which included also 60 hours of training on basic IT skills.
- In order to address the problem of ethics in the professional practice, the curriculum gave a new emphasis on this theme by creating the new course of Forensic medicine and by including this theme also in the integrated courses of Introduction to Medicine and Clinical Skills and Nursing.
- In order to improve the acquisitions of better communication and managerial skills for the Liberian future doctors, it was created the new course of Management and Communication skills; moreover, communication skills teaching was also included in several courses such as Introduction to Medicine, Community Medicine, Clinical Skills and Nursing skills.
- The Academic Senate could not accept the suggestions for addressing the problem of the excessive length of time required to become a medical doctor (neither creating a 4 year B.Sc. in Basic Medical Sciences, plus 3 year clinical Science at Dogliotti College, nor reducing the duration of the undergraduate program) because of the weakness and pitfalls of the high school and university education in post-war Liberia.

As for the teaching and learning strategies, the Need assessment phase highlighted very poor teaching standards at the Dogliotti College, with too much theoretical teaching, the lack in the use of other methodologies except lectures and notes dictation and the total absence of interaction between students and teachers. Therefore, the curriculum review Phase has foreseen the conduction of workshops and laboratories on more student-centred teaching methodologies such as Problem Based Learning and Case Study. In the New curriculum, teaching and learning activities are thus based on the principles entailed in internationally recognized adult learning theories, with group learning and on-the-job training as main methods for delivering the curriculum.

Therefore, for theoretical teaching, didactic lectures, didactic labs and seminars are arranged in order to enhance the conceptualization of facts and principles with the use of appropriate audio-visual aids and Problem-Based Learning (PBL) sessions; practical teaching promotes tutorials, case study and practical and lab exercises for developing practical and laboratory skills development with microscopic, cytological and histological readings, image projection, scientific and forensic autopsy. As an example, in the integrated course of Laboratory Medicine 1, including the disciplines of General and Systemic Pathology and General Medical Microbiology, gross specimens and sets of microscopic slides demonstrating general disease processes and the more common specific diseases in Liberia will be used during the laboratory periods. Pictures/photographs of typical lesions of common disease entities are projected during the laboratory conference/projection hours. Integrated in this module are lectures, demonstrations, group discussions, case histories, post mortem examinations, journal reports, clinicopathological conferences and group discussions. Traditional curriculum will be supplemented by problem based or complaint based tutorial cases. Moreover, diagnostic laboratory exercises are foreseen, in which students are expected to complete an online Virtual Microbiology Laboratory.

Finally, activities that promote self-directed learning, like research projects, are also included in the New curriculum (i.e. the course of Medical Biochemistry 2 foresees the design and presentation of a research project of one's own interest by using biochemical concepts and tools available).

Moreover, in order to successfully update the teaching materials and standardize and improve the teaching standard of all courses, a special role was played by development of Course Portfolios. Course Portfolios in this context were conceived as a set of materials documenting teaching activities and a tool to guide the development of the training methodology, its objectives being those of engineering the educational process and standardize the teaching and learning activities.

According to the Guidelines developed ("Portfolio Development: A Guideline" available from <http://www.iss.it/ures/?lang=1&id=75&tipo=4>), a Courses Portfolio should include:

- *Teaching unit contents*
It specifies: credits; hours ; aims; core curriculum by discipline (if it is an integrated course); specific objectives (by discipline if integrated course); learning activities; outcomes (practical and communication skills); student assessment; module evaluation by student (feedback or satisfaction questionnaire); module assessment (pre-post test); learning resources.
- *Learning Memorandum template*
It is the result of a negotiating process between teacher and student and is used to lay down the skills that the latter wishes to achieve in his clinical experience and the training and assessment considered appropriate in view of the defined objective.
- *Schedule with all activities to be implemented during the course.*
- *All the lessons plan*
A lesson is an organized set of activities designed to present one manageable sized piece of the Course, not to be confused with the Lecture, which is just one teaching technique that can be used in a lesson.
- *All the lectures* (i.e. the power point presentations to be used)
A lecture is the presentation by the teacher of the course content regarded as fundamental for the acquisition of basic knowledge in a given discipline.
- *All the exercises*
An exercise is an activity at the end of which one should have a clearly definable and objective result, aimed at developing practical skills, using the theory and concepts previously discussed. It can be written, oral or practical; it can be individual, in pairs or groups (small groups, peer groups, case studies); it can be a means of assessing skills, etc. (including self-assessment).
- *Tutorials organization with time frame - who will do what, where and when*
A tutorial consists either of a one-on-one course or a small seminar and is meant to be an on-going conversation in which the tutor and tutee(s) move through the academic landscape of a particular discipline.
- *Essay and its criteria (e.g. no. of pages, length, % of exams credits)*
Essays are shorter pieces of writing that often require the student to owe a number of skills such as close reading, analysis, comparison and contrast, persuasion, conciseness, clarity, and exposition, its purpose being that of encouraging students to develop ideas and concepts in their writing with the direction of little more than their own thoughts.
- *Student and course assessment.*

The production of detailed Courses Portfolio for all the courses addressed the shortcomings emerged with reference to the Evaluation System, by standardizing all evaluation methods and procedures and by linking students' assessment to the course specific objectives and to the type of skill to be evaluated, thus enduring two simple educational principles: 1) assessment methods

should match the learning modality; 2) students are entitled to learning experiences which will adequately represent the assessment methods.

The evaluation system was built around the following components:

– *Student assessment in terms of knowledge evaluation, and clinical/practical skills evaluation*

The following components are evaluated:

- Attendance (to assess student's readiness to sit the examination: less than 90% attendance not qualified for exams)
- Participation in the class (in terms of interaction and active participation)
- Written examination (Multiple Choice Questions, MCQ; Essays; Lists; True & False; Fill in the blanks; Matching; etc.)
- Oral examinations (prepared questions are placed in a box and randomly selected by the students)
- Practical examinations (demonstrations, scenarios, case studies, etc.)
- Class presentations.

– *Teaching assessment (student survey of instruction).*

It is a students' feedback questionnaire on the following aspects: Quality of Instruction (including professor's punctuality, regularity, preparedness, knowledge, clarity, enthusiasm, at the end of the course); Instructor-Student Interaction; Classroom Activities and/or Assignments; Grading.

– *Module or Course assessment*

- Pre-post test for assessing the students' baseline at the beginning of the course and the level of progress at the end of the course;
- Peer review and evaluation of students' questionnaires by the Committee of Department & Faculty for the performance evaluation at the end of the semester.
- Final exam, at the end of the semester.

4. NEW CURRICULUM OF THE DOGLIOTTI COLLEGE

4.1. Curriculum overview

Harden defines curriculum as “a sophisticated blend of educational strategies, course content, learning outcomes, educational experiences, assessment, the educational environment and the individual students’ learning style, personal timetable and program of work” (Harden 2001) As such, discussing the curriculum can involve looking at what is taught (the syllabus), how it is organized (the process, progression and order of courses), how it is taught (teaching praxis and educational philosophy), and its aim, i.e. the product or outcomes (the competencies of the graduates). A brief discussion of the above-mentioned elements of the Dogliotti College new curriculum follows, as resulted from the curriculum development process:

– *What is taught?*

Traditionally, curriculum content has been driven by the teachers or has been made by relying on the judgment of experts to determine what a neophyte in the profession ought to know and ought to be able to do. Several studies have observed that faculties and trainees differ in their perspectives on learning objectives and outcomes (Morcke *et al.*, 2006), tend to overestimate the relevance of their own areas of expertise (Koens *et al.*, 2006), while underestimating the difficulty of learning content and skills with which they are familiar (Bransford *et al.*, 2000). This may become an issue with curriculum committees or consensus panels as well. Therefore, though the curriculum is always the result of human agency and, as such, always reflects personal beliefs and values, medical education has gradually moved into the realm of evidence-driven practice and it is no longer acceptable to base educational decisions on opinions, intuition and personal preferences. Certainly expert opinion is an important source of information but it is also possible to make this decision on the basis of scientific evidence or empirical data about what competent health personnel need to know and need to be able to do in order to fulfil their responsibilities. It is for ensuring that the curriculum content was based on such empirical data that the curriculum development process, object of the present project, was based on the scientific curriculum-building principles and on the outcome-based approach to curriculum planning. By beginning the process defining which competences a graduate should have after graduation and then proceeding backwards from outcomes to the other elements (content, teaching and learning experiences, assessment and evaluation), it was ensured the relevance of the curriculum content for the Liberian population health needs. The Need assessment phase was thus aimed at focusing the curriculum by defining the deficits in knowledge, attitude or skills that currently exist in practitioners and the ideal approach to teaching and learning these objectives, in an attempt to design a curriculum which can meet the needs of society and students. This, together with the other steps of the process ensured in particular the inclusion of relevant content for the country health situation (i.e. improving teaching on mental health and on practical skills) and for improving the performance of the medical profession in Liberia (i.e. improving managerial skill, ethics, monitoring)

– *How is it organized?*

In medical education, there are a few prevailing curricular models which embody different approaches to teaching and learning. As for the new revised curriculum of the Dogliotti College, its design maintained the traditional Pre-clinical and Clinical division

and a mainly discipline-based approach. However, the curriculum transcended traditional subject boundaries through the introduction of several integrated courses in which different subject disciplines are fused together. This issue will be examined later on, with the analytical evaluation of the curriculum.

As for the appropriate ratio between different subjects in terms of time and number of lessons and exercises, this issue was handled by critically reflecting on the training needs identified, on the existing curriculum schedule and on the schedule of WAHO Harmonized curriculum, which was taken as a gold standard. According to this evaluation, the number of hours allocated to each Course was increased or diminished.

The ratio between theoretical and practical teaching was decided in a way that the final student clinical competence is at the highest possible level of the Miller's pyramid (Miller, 1990), going from 'know' (knowledge) to 'know how' (competence), 'show how' (performance), and 'do' (action). Therefore, the division of theory, practice and individual study hours (20%, 40% and 40% respectively for pre-clinical courses and 20%, 60% and 20% respectively for clinical courses) was decided by following modern trends in education and the suggestions of Bologna Declaration of June 1999, besides the WAHO Harmonised curriculum recommendation.

– *How is it taught?*

The instructional strategies developed are aimed at providing active and life-long learning process, and capacity for the application of student's knowledge in the practice, and were selected according to the human and technical capacities of the College. The choice of the most appropriate teaching and learning methods for each Course is the result of the following considerations:

- relevance to learning outcomes and content;
- promotion of critical and logical thinking;
- teaching and supervision of practical skills;
- support for independent study;
- resources available;
- constraints;
- relationship with assessment.

This issue is discussed in more detail with the analytical evaluation of the curriculum.

– *What's its aim?*

The aim of a medical curriculum is its product, namely the competences of the graduated student, which for the Dogliotti College can be summarized as follows:

- effective communication;
- basic clinical skills;
- using basic science in the practice of medicine;
- diagnosis, management and prevention;
- lifelong learning and problem solving;
- self-awareness, self-care and personal growth;
- the social and community contexts of health care;
- moral reasoning and clinical ethics.

4.2. Curriculum analytical evaluation

In the past four decades, medical education research has developed its evidence base and together with research in education, psychology and cognition become more able to suggest

efficient and effective approaches to teaching. Central among these are a shift from a teacher-centred, didactic approach to a Student-centred and Problem-based curriculum characterized by integrated teaching and Community-orientation, making use of Elective study periods and of a Systematic approach to curriculum planning. These six educational strategies, forming the acronym SPICES (Harden *et al.*, 1994), have been the building blocks of modern curricula across the world, as trends in medical education abandoned the Flexner (1910) model characterized by Teacher-centred, Knowledge giving, Discipline led, Hospital oriented, Standard program and Opportunistic or apprenticeship approaches.

Herein, the Harden’s SPICES model for curriculum planning provides us with a framework to identify the profile of the new medical program of the Dogliotti College by evaluating where it is positioned on each of the six educational strategies. Figure 8 represents the SPICES continuum where each of the six educational strategies is presented as a spectrum between the two extremes: on the left are the more innovative approaches (SPICES) and on the right are the more traditional strategies. By looking at each issue separately, we will provide a brief outline of their key features and then determine where the new Dogliotti College curriculum stands by positioning a cursor on the continuum from one extreme to the other.

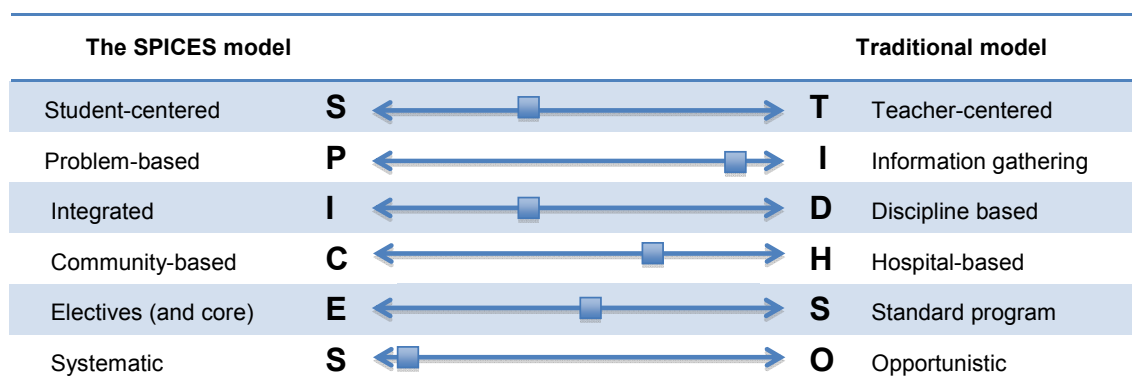


Figure 8. The educational strategies of the Dogliotti College medical curriculum (adapted from Harden *et al.*, 1984)

Here is the analytical evaluation of the Dogliotti College new curriculum issue by issue:

– *Student-centred vs Teacher-centred education (S ↔ T)*

In a teacher-centred approach to curriculum planning, the teacher is the key figure; the emphasis is on what the teachers teach and on activities such as the formal lecture and the formal laboratory. On the contrary, in a student-centred approach the emphasis is on the students and on what and how they learn.

It is now largely recognized that teaching is not just about learners acquiring information: learners need to structure the information and be able to think with it and use it (Biggs & Tang, 2007). According to constructivist theories of learning, which constitutes the foundations of the concept of constructive alignment, knowledge is ‘constructed’ by learners using their own activity rather than being ‘instructed’ by teacher; students organize and synthesize what they read, hear and do, linking new information, structuring it so that it is usefully stored in the long-term memory (Barrow *et al.*, 2010). The emphasis has thus moved from teaching to learning: what matters is what the student learns rather than what the teacher teaches, to acquire knowledge rather than to transfer

knowledge, the learning tools rather than the didactic lessons, with an active rather than passive role of the student.

One of the effects of thinking in terms of learning outcomes, as foreseen by the outcome-based approach to curriculum building used here to develop the new curriculum, is this shift in focus from the teacher to the student, from teaching to learning. By moving away from ‘topic based’ teaching in which the teacher determines what information is relevant to learn, towards building the curriculum on a series of statements of what the learner will be able to do having successfully completed a set of learning, the Dogliotti College new curriculum can be said to be characterized by a student activating – and constructively aligned – approach to learning. Moreover, the new curriculum abandoned the previous ‘teacher as expert’ style, which utilized more didactic teaching methods such as lectures, in favour of more learner-centred approaches and interactive methodologies such as tutorials, group discussions and case-based learning. Finally, the creation of Courses Portfolio’s may work as Study Guides, which are one of the approaches helping the shift towards more student-centred learning, by showing students what they are going to learn in terms of learning outcomes and activities, besides assessing methods, and identifying the educational resources available to encourage self-learning (O’Connell, 2009).

With a student-centred approach, students are more motivated and better prepared for continuing education after graduation because they are more actively involved in their own learning and take more responsibility for it. However, teachers who have experienced a predominately teacher centred approach, such as those of the Dogliotti College, may find it difficult to teach in a more student-centred approach. Likewise, students may find this approach more threatening and demanding initially, especially if previous experience was in the teacher-centred model. More demands are also placed on teachers in the preparation of a wide range of learning experiences and resources, as opposed to the relatively easily prepared and perennially repeatable lecture series. The application of this approach at the Dogliotti College has therefore to be monitored and assessed in the middle and long term.

That being said, however, the cursor on the axe S-T can be placed closer to the S end on the left, as shown in Figure 8.

– *Problem-based learning vs Information gathering (P ↔ I)*

The function of medical education is that of enabling learners to develop critical thinking and reflective and problem solving skills in order to be effective future practitioners. Once qualified, students are expected to be able to synthesize the large body of basic science and clinical knowledge studied, and apply it to the care of the patients.

Moving from lecture-based to a student activating approach such as PBL (Barrows & Tamblyn, 1980) is considered to have a greater impact on changing physician learning and behaviour. In PBL, the ‘problems’ or cases are written to simulate real-life clinical problems and by addressing them, students learn to place propositional knowledge into ‘real world’ context; such approach improves the retention and application of knowledge, promotes self-directing learning, critical thinking and reasoning and help students to develop skills in solving problems.

The introduction of innovative curricula such as PBL was recommended by the WHO Regional Office for Africa, with the Cape Town Declaration in 1995, which set the required attributes of the ideal doctor for Africa and the main modalities of effective medical education (WHO 1995). However, its effective implementation and support requires high cost resources and a set of attributes difficult to find and in need of development in Africa such as books, journals, computer and Internet accessibility, together with facilitators who are competent and dedicated.

A systematic review of the literature conducted within the Sub-Saharan African Medical Schools Study (SAMSS) project revealed that PBL strategies have been integrated into many Sub-Saharan Africa (SSA) curricula in the last two decades, often incorporated with Community-based education and service (COBES) (Greysen, 2011). Many of the challenges described are familiar to educators using PBL anywhere, such as the need for faculty members to adapt their teaching skills to accommodate active learning and clinical reasoning, but some challenges, such as high start-up costs, lack of adequate learning materials and lack of prior experiences in adult learning for students, are especially limiting for schools in SSA. Moreover, implementing PBL in SSA often involves a complex balancing act: although faculty staff need not be experts in the content matter of the classes they facilitate – which affords greater flexibility and encourages mentorship – the mastery of PBL facilitation techniques can be challenging to staff more familiar with traditional pedagogy. Finally, many schools struggle to provide the increased staff resources and facilities required for PBL curricula, particularly in the early phases of implementation and in the context of faculty shortages. A study evaluating the outcome of innovative medical education at the University of Zimbabwe Medical School ten years after its inception shown that PBL was never fully implemented but rather a hybrid between PBL and a traditional lecture-based curriculum was adopted and most of the PBL components that were initially introduced had been discontinued prior to the time of evaluation, partly because of economic issues (Mufunda *et al.*, 2007). During the process of development of the new curriculum for the Dogliotti College, seminars were held on the PBL methodology by a professor of the PBL-based University of Cape Coast in Ghana. This teaching methodology has been included among others in several courses such as: Laboratory Medicine, Paediatric, Forensic Medicine, Embryology and Histology, Physiology, Pharmacology and Neuroscience. However, due to the above-mentioned drawbacks and barriers to the implementation of the PBL approach, it is very likely that it will remain just a ‘declaration of intent’ in the Courses Portfolios, until major changes will occur in the general context. Therefore, the cursor in this case must be placed very close to the I end on the right.

– *Integrated vs Discipline-based education (I ↔ D)*

In the past decades, there have been increasing pressures on medical educators for a move from the traditional discipline, or specialty-based curriculum. As medical science developed and the extent of knowledge increased, particularly around molecular biology, growing concerns were expressed about the volume of knowledge in medical curricula. The temporal and geographical separation of course content from clinical practice was also highly criticized in the light of developing understanding of student learning; indeed, when items of learning are presented to learners within context, knowledge is better valued, retained and consolidated. Moreover, the lack of integration can lead to unnecessary overlapping, repetition and curricular overload.

The need for greater integration between basic sciences and clinical training within a core system based medical curriculum, instead of the traditional practice of teaching these subjects as separate entities, has featured prominently in reports on medical education (Association of American Medical Colleges, 1984; Anderson & Swanson, 1993; General Medical Council, 1993). Integrated teaching offers many advantages and may be a key factor in the delivery of an effective educational program.

As for the other educational strategies, in the SPICES model integration is represented as a continuum with full integration at one end, discipline based teaching on the other. However, Harden (2000) provides us with another tool for assessing the level of integration of a curriculum, with the so-called ‘integration ladder’ and its 11 intermediate

steps between the two extremes. In the first four steps on the ladder, the emphasis is on the subject or discipline; moving up the ladder, the following six steps emphasize integration across several disciplines; in the final step, the student takes more responsibility for the integration and is given the tools to do so.

The new Dogliotti College curriculum, though maintaining its traditional pre-clinical/clinical model, is characterized by an integrated approach, which is still subject centred but transcends the traditional subject boundaries through the introduction of several integrated courses. These courses are usually made by two or more disciplines coming together to offer a teaching program and a joint course. Such an integrated approach may correspond to the sixth step of Harden's integration ladder: sharing (or joint teaching). Here, the shared planning and teaching takes place in complementary disciplines in which overlapping concepts or ideas emerge as organising elements and the joint course produced emphasizes shared concepts, skills and attitudes. The impetus for shared programmes usually comes from the identification of common areas of teaching and the idea that together the subject can be taught better, more effectively and more efficiently.

An example comes from the Community Medicine integrated courses, which run from the 1st to the 5th year to prepare the students to function as community and primary care physicians. As such, the course is made up of different disciplines, from public health to social and economic sciences, with subjects such as epidemiology, disease control and prevention, environmental health, PHC, occupational medicine, global health, health systems, research methodology, medical sociology and anthropology, demography, economics and management. The idea emerging as organising element is the link between the socio-economic, cultural and physical environment and the health of individual patients and the communities and the shared concepts, skills and attitudes emphasized are the following:

- attention to socio-cultural aspects of patient care;
- coordination of community's health resources in the care of patients;
- identification of and intervention in a community's health problems;
- assimilation into a community and participation in its organizations

In addition to the introduction of integrated courses, the curriculum development process establishes the institution of a person in charge of each Academic Year that, together with the existing pre-clinical and clinical Coordinators, monitors the harmonization of the different courses and avoids overlapping of subjects.

As a result, in Figure 8 the cursor on the spectrum $I \leftrightarrow D$ can be placed closer to the I extreme on the left.

– *Community-based vs Hospital-based education ($C \leftrightarrow H$)*

This feature relates to where students acquire their clinical skills and professional behaviours. In the traditional pre-clinical/clinical programs, students are primarily based in hospital (typically large teaching hospitals) settings, where they undertook fairly unstructured, apprenticeship style placements, where they were allocated to a consultant and his/her team for a specified length of time. These placements are variable in quality and students are not necessarily learning the same thing or the right things for their future medical practice.

Increased attention is now paid to ensuring that the clinical learning experiences are more standardized, structured, tailored to all the different health needs and have specific learning outcomes, are assessed and are of appropriate quality. A way in which medical curricula are responding to this challenge is by extending learning into the community.

Over the last decades, there has been an increasing emphasis on students learning in the community as part of their undergraduate medical education. The idea of partnership with communities and a shift of location of clinical teaching has been a highly influential model in many medical schools predominantly in Australia, Canada and the UK (McKimm, 2010). This has been driven by a number of factors, including global health strategies, workforce imperatives, changing caseloads in tertiary hospitals and recognition of importance of generalism in medical education (Worley *et al.*, 2006). In Sub-Saharan Africa, community based education and service (COBES) has been an important component of some schools since the first era of expansion in the 1960s and 1970s, with substantial variations among schools: family attachment, visit to rural homes and health centres, small group discussions of community and public health topics (Greysen *et al.*, 2011). Structured community exposure and community-based education provide students with experiences working with underserved populations and improve graduates' preparation to deal with national health problems (Mullan, 2011). A number of schools in Nigeria have significant community-based medical education component in their medical curriculum and this confirms that it is possible to adopt these innovations in poor rural Africa (Gukas, 2007).

During the process of development of the new curriculum for the Dogliotti College, a seminar on this topic was conducted by a professor from the Ilorin Nigerian University, whose program is based on COBES and is designed to introduce students to the community at the very earliest phase of their medical education with the view to sensitizing them to the community health needs.

In the Dogliotti College new curriculum, the clinical teaching is to be conducted at the JFK teaching Hospital. However, efforts have concentrated during the new curriculum development toward a more standardized and structured clinical education for all students, by identifying specific learning outcomes for the clinical skills taught for each discipline, formulated in terms of 'to have seen, to have done, to be able to do'. Teaching activities were then aligned to these specific outcomes, as well as the assessment methods, thus ensuring the quality and relevance of the clinical teaching. In order to complete this virtuous process, a written agreement between the Dogliotti College and the JFK Hospital has to be stipulated, as stated by the Recommendations to the implementation of the new curriculum.

In addition, certain courses in the new curriculum foresee the use of practical trainings to be performed outside both the university and hospital setting, such as Rural Posting in Community Medicine courses, with the assessment of workplaces.

Therefore, as shown in Figure 8, the cursor has to be placed much closer to the H than to the C end, though still in a quite intermediate position.

– *Elective-driven vs Standard program education (E ↔ S)*

In a standard medical education program, all students pass through a set of prescribed courses with a few, if any, opportunities to study a subject in more depth or to study a subject of their own choosing which has not been covered in the programme. In recent years there has been a significant increase in curricular flexibility where electives are incorporated into the programme.

Elective programs can be in a number of forms: they may be intercalated years of study in the curriculum during which time students can select one or more subjects to study in depth; or may be shorter elective periods in which students can select one from a number of available courses on projects or a subject or area of their own choosing.

This system gives students more responsibility for their own learning and facilitates career choice and is also a way of coping with an overcrowded curriculum. However,

electives can overload teachers with work, may impinge on other coursework and may be difficult to assess fairly and uniformly.

In the Dogliotti new curriculum, the possibility of choosing an elective course has been introduced at the fourth year level, it has been introduced the possibility of choosing an elective course at the fourth year, for a total of 80 hours. It is not such a minor change or effort if we consider the shortage and overload of the current teaching staff at the Medical College. Nevertheless, the cursor has to be placed closer to the S than to the E end, as shown by Figure 8.

– *Systematic vs Opportunistic (apprenticeship) education (S \leftrightarrow O)*

The traditional model of the medical course is the apprenticeship one in which students are attached to one teacher or clinical unit or hospital ward for a period. The teaching itself is largely opportunistic and in medicine is based on unpredicted clinical situation as they arise. There is now a strong belief that the teaching and learning experience, particularly in the clinical area, should be planned and recorded.

In a planned or systematic approach to the curriculum, a programme is designed for all students so that the experiences needed for training are covered. This may for example entail the students' rotating round a number of specialties and working in a number of fields within the health care delivery system, with the essential components of the course clearly spelled out, a list of skills the students have to master available, together with a list of patients with conditions that students are expected to have seen and examined. This systematic approach can then be reflected in the assessment system.

One approach to making the curriculum more systematic is the outcome-based education, since student learning is focused on predefined learning outcomes, aligned with the teaching and learning activities and the assessment tasks. Therefore, in this case, the cursor will be placed definitively at the S extreme, since the whole Dogliotti College curriculum development process was based the principles of the OBE, and on a dynamic, interactive, iterative and systematic approach in a cyclical arrangement.

There is now a common understanding that the SPICES educational strategies can offer many advantages, while continuing with traditional approaches ignores the changes that are taking place in medical education and may lead to an increasing discrepancy between the health care delivery system and the medical curriculum. However, as Harden puts it "too many spices in food may make it unappetizing and inedible", meaning that each issue represents a continuum between two extremes, and the extremes are almost always undesirable. Therefore, it is likely that the optimum position for a school will be at some point between the two extremes, depending on the educational advantages of each approach with reference to the aims of the school, and practical or logistical considerations. Studies have argued that most African medical schools have attempted to maximize some of the benefits of the traditional training methods, including a strong preclinical/science component, strong bedside teaching and student-patient contact time (Gukas, 2007)

The SPICES analytical technique allowed the identification of the Dogliotti College new curriculum profile (the current 'optimal position') by evaluating where its stands on each of the educational strategies, and possible reasons for it.

4.3. Analysis of the curriculum development process

The main characteristics of the development of the Dogliotti College worth stressing here, besides those common to the features of the approaches underlying the methodological framework are its being at the same time a participatory process and a formative process.

It is a participatory process since all the activities, from the Preparatory phase to the curriculum review, were conducted by using the local expertise, with the involvement of professors from the Department of Sociology of the University of Liberia, Liberian experts of public health and education, local team for data collection) in both the conduction of the activities of the Needs assessment and in the Curriculum review phase.

Moreover, the process attempted at involving all possible stakeholders, from the Dogliotti College (teaching staff and students), the health service personnel (medical doctors and health workers), and the institutions (from the Liberian Ministry of Social Welfare and Health, the University of Liberia, the major Hospitals, the Liberian Dentist and Medical Association, and from international organization such as the World Health Organization in Liberia) to the community at large, through their participation to Focus group discussions and individual interviews.

The main advantages of such a participatory process are:

- joining of individuals and stakeholders with diverse expertise and interests to address complex issues in health and education;
- improving activities design and implementation, i.e. by facilitating participant recruitment, increasing the quality and validity of the research and the enhancement of the relevance and use of data;
- translating potentially research findings to guide the development of curricular change;
- benefitting the community and ‘researchers’ alike through the knowledge gained and actions taken.

Most importantly, the participatory process resulted in the endorsement of the new curriculum by the College and the institutions on one hand, thus facilitating the overcoming of their resistance to change and obtaining institutional support, and on the other by the students themselves, who are therefore put at the centre of the educational process.

Thanks to the workshops, seminars and laboratories on course planning, teaching methodologies, integrated modules and evaluation systems, which were offered to the College teaching staff who then applied this knowledge while developing the new curriculum and all the components of the Courses Portfolios, the whole process had an important formative function. These staff development activities, or Faculty development as it is often called, were designed to improve teachers’ knowledge and skills in the areas of teaching and in organizational and curricular development. As it is recently argued, Faculty development has become an increasingly important component of medical education, it has a definite role to play in curriculum development efforts and has been used as an approach to curricular change (Steinert, 2008).

During the process described here, Faculty development formats such as workshops and seminars were thus used to improve the Dogliotti College teachers’ effectiveness on Faculty development common content areas such as small group facilitation, group presentations, feedback and evaluation, use of technology in teaching & learning. The main advantage of this formative process is the empowerment of Dogliotti College staff, meaning their being able to permit change to happen, not only at an organizational or content level but also at the level of competence and capacities.

Successful curricular change, however, can occur only through the dedicated efforts of effective change agents. Bland *et al.*, (2000) conducted a literature review on educational

curricular change and identified the key characteristics that have been found effective in facilitating successful and enduring curricular change in medical schools and other educational settings. Among these, the following may play a positive role for the Dogliotti College curricular change:

- *Need for change*

In order for change to occur and be lasting, there need to be a widespread agreement that change is required. Here lies the importance of the huge research effort, which characterised the Dogliotti College curriculum development process. The Need assessment phase, through the identification of the shortcomings of the medical doctors' skills for answering the population health needs, the analysis of the deficiencies of the curriculum in force and the training needs of the students and future doctors, provided the evidence of the need for change.

- *Participation by the organization's member*

As an organization's members invest themselves in the project through their participation, they strengthen their commitment to see the project through to completion. Participation also hastens members' skill development and increases the likelihood of the innovation's being formulated and implemented in ways appropriate to the organization's context. As already argued, this is one of the key characteristics of the Dogliotti College curriculum development process.

- *Human resources development*

For change efforts to be most effective, the organization must be attentive to the particular needs that arise as members move through the change process. Therefore, it is of utmost importance that change implementers, in this case the Dogliotti College staff, understand the theoretical underpinnings of the desired innovation and are trained in the skills required to implement it, as done with the workshops and seminars offered.

Another important characteristic of the Dogliotti College curriculum development process described here is that it is well documented and sufficiently described in all its steps, to allow others to replicate the process. Green (2001) highlighted the importance of uniform reporting for curriculum development articles or documents and outlined a guide with the main features which should be reported for a critical appraisal of medical education curricula: curriculum development phase (justification; analysis of local program and educational needs; review of other curricula and related medical education literature); learner and program characteristics; learning goals and objectives, instructional strategies, feasibility and sustainability, effectiveness. Among these, the first four features of the Dogliotti College new curriculum are described in sufficient details.

Finally, some of the advantages associated with the conforming to the Harmonized curriculum of the ECOWAS region, include: similar scientific content for all basic medical training institutions, acquisition of equivalent skills, favouring free circulation of health professionals and easy mobility of teachers and students.

4.4. Limits and challenges

Hereinafter, the main limits and weaknesses of the new curriculum and of the curriculum development process conducted are pointed out, together with the main challenges for the future.

Probably, the most important characteristic of successful innovation is that the innovation and the strategies used to implement it must be appropriate to the context of the organization

and its environment. Therefore, the scope and complexity of the change effort depends on the real possibility for it to be implemented. As for the Dogliotti College new curriculum, one of the problems emerged from the situation analysis, which has not been addressed by the curricular change, is the issue of the excessive length of time required in Liberia to become a medical doctor. This is due to the Dogliotti College entrance requirement of a Bachelor of Science, which determines that normally a student has to go through four or five years of undergraduate study, plus 5 years at the Dogliotti College, for a total at least 9 years. Though recognizing that such a situation does not help overcoming the problem of the dramatic shortage of medical doctors in Liberia, it was decided not to change this policy because of the weakness and pitfalls of the high school and university education system in post-war Liberia. Other solutions proposed, such as creating a four-year Bachelor of Science in Basic Medical Sciences, plus 3 year clinical Science at Dogliotti College, or reducing the duration of the undergraduate program, would have required the involvement of the University of Liberia and other governmental institutions, making the change effort at the moment too ambitious and complex.

An element of the curriculum which probably turned out being too ambitious is the level of detail required for the development of the Courses Portfolios', which included the lectures, the tutorial, the exercises and so on. This required an excessive effort for the limited capacity of the Dogliotti College staff, both in terms of number of teachers and of their acquaintance of the teaching methodologies to be introduced in the new curriculum. Indeed, the process of development of detailed Courses Portfolios is still on going. Provision of further support to this process in the framework of the completion of the activities of MAE/DGCS-ISS Project in Liberia is highly desirable.

As for the process itself, a criticism that may arise is relative to the length of the Need assessment Phase, pivotal element of the methodological approach adopted, which lasted 5 months from April to August 2010. Indeed, the identification and critical analysis of the health care problems to be addressed by the curriculum and of the deficits in knowledge, attitude and skills that exist in practitioners on one hand, and the definition of the ideal approach to teaching and learning these objectives on the other, required substantial research efforts. The critics of Kern six step approach maintain that many of the possible findings of a needs analysis are, in fact, already known by the teachers from experience and intuition and that the time and resources spent in doing it are not justified by the results. As argued by Stefan (2010), however, to date, no comparison between the results of a need analysis and those of surveying the opinions of the teachers on the needs in question has been published.

As for the challenges for the future, Guilbert (2001) stated that, though "the old war songs of medical education (community orientation, active learning, etc.) have been repeatedly ventilated" very few medical schools on the planet have put these principles into practice. In Africa, only a few countries have been carried along in these changes, for many reasons. As pointed out by Gukas (2007), socioeconomic and political instability, failure to rapidly overcome the inertia for change by substituting the old curriculum with a more problem and student-based one and redefining the goals of medical education are some of the issues of concern for Africa, and its ability to keep up in the dynamic world of medical education. There are only few faculty and school managers with effective medical education backgrounds to initiate, evaluate and sustain these changes. According to Burdick (2007), the challenges facing health professions education in Africa focus on physical infrastructure, accreditation systems, student selection and assessment, and faculty recruitment, retention and development.

The new Dogliotti College curriculum introduced many important innovations for both the teachers and students, emerging for several years of missed education and training. How and how much of the new curriculum will be implemented? In this context, the role of the curriculum evaluation framework is essential; the monitoring and assessment tools will be

pivotal for understanding the real barriers and constraints to its implementation, thus identifying ways for supporting and guaranteeing a real progressive change.

5. CONCLUSIONS AND RECOMMENDATIONS

As with many countries around the world, in Liberia there is a pressing need for more doctors in the right place, at the right time, with the right skills, providing the right care. The health workforce gap is one of the major bottlenecks to the success of the rebuilding of the Liberia health system. Medical education plays a key role in equipping the health workforce with the doctors that it requires and the way in which the curriculum is designed and structured is immensely influential.

The present project focused on the design and implementation of a participatory, formative process for the development of a new medical curriculum in the framework of the MAE/DGCS-ISS project's objective of strengthening the training capacities of the Dogliotti College of Medicine of Monrovia.

Characterized by a strong adherence to the scientific curriculum-making principles, which recognizes the needs assessment as the basis for structuring the internal architecture of curriculum design, the process resulted in a curriculum that is relevant to the context and answers to both the students' needs and the population health needs. With the careful alignment of aims, learning outcomes, teaching approaches and assessment methods, the new curriculum places the Dogliotti College teachers in the best possible position to create an environment that supports student learning.

The most innovative aspects of the curriculum development process designed and implemented is its strong participatory character and formative function, with the participation of a number of stakeholders – from the College teachers and students to the medical doctors and other health services personnel, the institutional stakeholders and the community at large – to the activities of the preparatory, needs assessment and curriculum review phases, and the training and support offered during the process. Moreover, the development of detailed Courses' Portfolios, though not completed, led to the engineering of the educational process and the standardizing of the teaching and learning activities.

Therefore, the final product of the process described here – the Dogliotti College new curriculum – represents an instrument and a method: a toolkit, meaning a set of tools and resources for the development of competences and abilities, which is at the same time flexible and replicable.

Medical curricula need to be dynamic and responsive to external influences and changes if they are to ensure that the doctors of the future have the knowledge, skills and attitudes required by the communities they serve. Medical curricula also need to emphasize current concerns about doctors' performance including professionalism, concerns for patient safety and drive towards continuous quality improvement in health care.

Change, however, is a difficult and lengthy process, requiring sustained energy; it often takes longer than anticipated and depends on several conditions. Curricular issues alone are not sufficient for increasing the quantity and quality of medical school graduates and improving the health workforce problems. The following issues have to be addressed in order for the health professions institutions to face the challenge in Liberia and Africa at large:

- *Physical infrastructure and equipment*

Stable electricity supply is problematic throughout Africa, but also adequate communication infrastructures, including Internet for the access to online information resources (journals, databases, textbooks and other learning resources) and for the exchange of information and ideas among educators.

- *Accreditation of health professions schools*
Health professions institutions must participate in the development of rigorous and fair accreditation processes, which are important to standardize medical education and physicians capabilities. Strengthening the data resources within schools is essential if health profession institutions are going to participate in self-assessment or external review in relation to accreditation standards.
- *Faculty recruitment and retention*
Schools require faculty who are adequately paid to teach and manage the education programme; the current low university salaries result in low morale, poor retention and need for supplemental income that takes time away from teaching. Limited opportunities for postgraduate education in medicine are another significant factor reducing the potential pool of top quality graduates for clinical practice and of qualified faculty in colleges.
- *Faculty development*
Teaching faculty education and assessment methods, as well as management and leadership skills is another challenge for health professions institutions.

In many of these areas, the international donor community, operating in partnership with governments, can play a significant role.

To conclude, health professions education in Liberia can impact health by aligning the medical curriculum with national health needs, as the Dogliotti College New curriculum tried to do, only if supported by a robust faculty, solid physical infrastructures and the commitment of the Government and of the international community.

Liberia is fortunate to have a qualified and credible social and health leadership who is being implementing an ambitious agenda to make Liberia emerge from the disastrous post-war situation and become a safe middle-income country. It is clear that when workforce strategy targeted funding and tailored programs are aligned, there is huge benefit, not only to the students but also to the communities and ultimately improved health outcomes.

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