PERCEPTIONS OF MEDICAL TEACHERS ABOUT INTEGRATED CURRICULUM
Ziyad Afzal Kayani¹, Irum Gilani²

ABSTRACT

BACKGROUND: There is a significant progress in medical education in recent years but still there is room for reforms and innovations. Development of curriculum is a dynamic process which is ongoing since centuries. With advances in medical sciences, changes in patterns of diseases, changing socio-economic realities, periodic updating of a curriculum is necessary. Medical curriculum has gone through many reforms and for implementation of a new curricular reform detailed understanding of implementer’s perceptions is mandatory.

AIM: The study is aimed to determine the perceptions of medical teachers about curricular reforms.

METHODS: Search was done utilizing the PubMed and ERIC databases and grey search utilizing search engine Google and Google scholar, following the Haig and Dozier approach. Optimal search with combine natural language and controlled vocabulary approaches was used.

RESULTS: After initial selection of 237 articles relevant to the research question there abstracts were studied, inclusion and exclusion criteria were applied and it was found that there are many articles which are nonspecific (not having proper study designs, conference proceedings) and 10 were duplicate. Three themes were identified after search: Theme 1: Evolution of integrated curriculum/ Historical Perspective, Theme 2: Implementation of the integrated curriculum and Theme 3: Failed reforms to implement the integrated curriculum

CONCLUSION: It is concluded that integrated curriculum in an organ-system-based model is a curricular reform that is well accepted by teachers around the world. It helped reducing the excessive information and repetition of content

KEY WORDS: Integration, perceptions, curriculum development, organ-system-based, thematic analysis, mix-methods research.

INTRODUCTION

Significant progress has been achieved in medical education in recent years, but there is still room for reforms and innovations.¹ Medical education is roughly divided into three periods:

1) Period before Flexner (until 1910), which was based on master-apprentice model,
2) Flexner period (1910-1970), during which biomedical approaches prevailed in education,
3) Society-centered medical education.¹

Development of curriculum is a dynamic process which is ongoing since centuries. With advances in medical sciences, changes in patterns of diseases, changing socio-economic realities, periodic updating of a curriculum is necessary.² Institutes plan curriculum for the learners through curricular committees which include all the stakeholders but mostly teachers play a major role in it.

Going through the history of curriculum it can be appreciated that in the eighteenth century in the earliest medical schools apprentice-ship-based curricular model was followed.³ In this model there were two semesters each having four months duration during which courses of anatomy, physiology and pathology were taught. Courses taught in the first semester were repeated in the second semester also.

Flexner argued that the master-apprentice model failed to train qualified physicians and that there was a need for greater emphasis on...
Science in medical education. An innovative curricular reform was planned and implemented in Pakistan but it was unsuccessful because of administrative, institutional and financial issues. We are following integrated curriculum in AJK Medical College, and we feel that for a successful reform process a thorough understanding of the history and reforms in medical curriculum needs to be understood. For this purpose we planned this systematic review. This was done by a systematic literature search to address all the issues beginning from history of integrated curriculum, teacher’s perception at that time and narrowing down to situation in Pakistan.

### METHODS

**Literature search technique**

Literature search was done utilizing the PubMed and ERIC databases and grey search utilizing search engine Google and Google scholar, following the Haig and Dozier approach.

An optimal search with combine natural language and controlled vocabulary approaches was used. While searching World Wide Web there is no consistency of words used by authors therefore natural language is used. Controlled vocabulary is structured hierarchy of terms for categorization and is used in databases like PubMed. It is documented that natural language terms combined with controlled vocabulary terms retrieve the maximum number of relevant records.

**Keywords**

Integration, curriculum, perceptions, curriculum development, organ-system-based, medical, teachers, medical college, thematic analysis, mix-methods research.

**Descriptors**

Boolean operators ‘AND’ and ‘OR’

**Inclusion criteria**

Human Studies

Meta-Analysis

Randomized Controlled Trial

English literature

**Exclusion / search restrictions**

Non English literature

Case reports

Editorial

Guideline

Reviews

Conference proceedings

### RESULTS

Table 1 shows the search strategy used to search the literature. Figure 1 shows the flowchart of the literature review.

After initial selection of 237 articles relevant to the research question there abstracts were studied, inclusion and exclusion criteria were applied and it was found that there are many articles which are nonspecific (not having proper study designs, conference proceedings) and 10 were duplicate. At last ten most suitable articles were selected for critical appraisal in the study. All the other articles referenced in this research were selected in grey search with Google. Table 2 shows the critical appraisal of selected articles. After thorough search three themes were identified:

**Theme 1: Evolution of integrated curriculum/ Historical Perspective**

**Theme 2: Implementation of the integrated curriculum**

**Theme 3: Failed reforms to implement the integrated curriculum**

### DISCUSSION

**Theme-1: Evolution of integrated curriculum/ Historical Perspective**

The word curriculum came from Latin which means race or course of race which again is derived from the verb “currere” means to run. Curriculum is a defined or prescribed course of studies, which students must complete in order to reach a certain level of education. An individual teacher’s curriculum means all the subjects that will be taught during a school year by him. A curriculum is a prescriptive, and is based on syllabus which simply specifies what topics must be understood and to what level to achieve a standard. A Medical college might refer to a curriculum as the courses required in order to get MBBS Degree.

A curriculum can be defined in a variety of ways; it is the content for which students are held accountable or it is a set of instructional strategies teachers plan to use. There is a history how curriculum has developed and different perspectives are a path followed from traditional to modern era. While planning or developing a curriculum attention must be given to the historical dimension of the curricular development and the problems faced by the curriculum developers over the past decades.

In the eighteenth century the earlier medical schools in North America followed apprenticeship based curriculum. Although medicine was taught in Baghdad in as early as seventh century and Islamic Spain in twelfth century in the form of lectures and same apprenticeship based model was followed. In this
TABLE 1: SEARCH STRATEGIES USED TO SEARCH THE DATABASE

<table>
<thead>
<tr>
<th>S.No</th>
<th>Key words or Search Terms</th>
<th>Google scholar search &amp; No. of results</th>
<th>Database searched PubMed &amp; No. of results</th>
<th>Database searched ERIC &amp; No. of results</th>
<th>Total Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Perceptions of teachers</td>
<td>1,920,000</td>
<td>2405</td>
<td>27,055</td>
<td>1949460</td>
</tr>
<tr>
<td>2.</td>
<td>perceptions of medical teachers</td>
<td>612,000</td>
<td>545</td>
<td>31991</td>
<td>644536</td>
</tr>
<tr>
<td>3.</td>
<td>Faculty perceptions</td>
<td>1,740,000</td>
<td>16451</td>
<td>7114</td>
<td>1763565</td>
</tr>
<tr>
<td>4.</td>
<td>Integrated modular curriculum</td>
<td>31,400</td>
<td>61</td>
<td>52</td>
<td>31513</td>
</tr>
<tr>
<td>5.</td>
<td>Integrated Curriculum history</td>
<td>1,200000</td>
<td>609</td>
<td>1,265</td>
<td>1201874</td>
</tr>
<tr>
<td>6.</td>
<td>2 &amp; 4</td>
<td>18,500</td>
<td>4</td>
<td>81</td>
<td>18585</td>
</tr>
<tr>
<td>7.</td>
<td>2 &amp; 4 with exact phrase</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>8.</td>
<td>2,4,6&amp;8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

FIGURE 1: Flow sheet of the Literature Review.\(^\text{10}\)

Records identified through database searching (n =1949460)

Additional records identified through grey literature (n =141000)

Records after duplicates removed (n =1097237)

Records screened (n =77237)

Records excluded (n =1020000)

Full-text articles assessed for eligibility (n =237)

Full-text articles excluded, with reasons (editorials, reviews and conference proceedings) (n =77040)

Studies included in qualitative synthesis (n =17)

Studies included with matching title and key words (n =10)
TABLE 2: CRITICAL APPRAISAL OF THE SELECTED ARTICLES

<table>
<thead>
<tr>
<th>Name of Author</th>
<th>Research Topic</th>
<th>Type of study</th>
<th>Sample</th>
<th>Data collection method</th>
<th>Data Analysis</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papa FJ, Harasym PH</td>
<td>Medical Curriculum Reform in North America, 1765 to the present</td>
<td>Descriptive</td>
<td>Five major curricular reforms</td>
<td>Content analysis</td>
<td>Themes</td>
<td>Medical education improved as each new curriculum model built on the strengths of past innovations and implementation at the same time overcoming the past weaknesses. Increasing interest in, attention to, and understanding of knowledge base structures and cognitive processes that characterize and distinguish medical experts and novices.</td>
</tr>
<tr>
<td>Cooke M, Irby DM, Sullivan W</td>
<td>American Medical Education 100 Years after the Flexner Report</td>
<td>Descriptive</td>
<td>40 Articles</td>
<td>Content analysis</td>
<td>Themes</td>
<td>Curricular reforms are never easy or simple but they are inevitable. The challenge is not to define appropriate content but incorporating it into the curriculum in a manner that emphasizes its importance relative to the traditional content and then finding and preparing faculty to teach this revised curriculum</td>
</tr>
<tr>
<td>Ali SK, Baig LA</td>
<td>Problems and issues in implementing innovative curriculum in the developing countries: the Pakistani experience.</td>
<td>Mixed Methods</td>
<td>Key informants 16, faculty 514, administrators 16</td>
<td>In depth interviews, focus groups and mail in surveys</td>
<td>Thematic analysis</td>
<td>Survey questionnaire were used for triangulation</td>
</tr>
<tr>
<td>Littlewood S, Margolis SA, Scherpibier A, Spencer J, Dornan t.</td>
<td>Early practical experience and the social responsiveness of clinical education</td>
<td>Systematic review</td>
<td>Bibliographic databases and journals from 1991-2000</td>
<td>Content analysis of articles</td>
<td>Themes</td>
<td>Vertically integrated curriculum; early practical experience helps medical students learn, and develop appropriate attitudes towards their studies and future practice, and also orientates medical curriculums towards societal needs</td>
</tr>
<tr>
<td>Cecilia K, Chan Y, Lillian Y</td>
<td>Faculty Perspectives on the “3+3+4” Curriculum Reform in Hong Kong: A Case Study</td>
<td>Case study</td>
<td>60 faculty members</td>
<td>Questionnaire on 5-point Likert scale</td>
<td>Thick descriptions &amp; SPSS</td>
<td>Teachers feel new university curriculum as an increase in workload, they shown understanding of outcome based learning and common core courses. They also had concern that reformed curriculum may not bring benefit to the students as most teaching is didactic during their school years. It is vital to prepare teachers in any curricular reform process.</td>
</tr>
<tr>
<td>Dashputra A, Kukaran M, Chari S, Manohar T</td>
<td>Perception of Medical Teachers toward Present Day Medical Education</td>
<td>Descriptive</td>
<td>Cross sectional study</td>
<td>73 Teachers</td>
<td>Questionnaire using Likert Scale</td>
<td>Descriptive statistics</td>
</tr>
<tr>
<td>Bandiera G, Boucher A, Neville A, Kuper A, Hodges B</td>
<td>Integration and timing of basic and clinical sciences education</td>
<td>Descriptive</td>
<td>30 National key Stakeholders</td>
<td>Interview</td>
<td>Thematic analysis</td>
<td>Teachers agreed that the medical teacher should be aware of the curriculum. They also felt that syllabus should be provided to the students. Most of them agreed that the quality of student is deteriorating in medical college. Maximum teachers were in favor of upgrading medical teaching with the help of Medical Education Technology</td>
</tr>
<tr>
<td>Ghayur S, Rafi S, Haroon A, Nadeem R, Iqbal M</td>
<td>Delivering endocrinology and reproduction in an integrated modular curriculum</td>
<td>Descriptive</td>
<td>86 students and 14 faculty</td>
<td>Likert scale questionnaire and free comments</td>
<td>Descriptive statistics and thick descriptions</td>
<td>70% students thought that clinical concepts were given more emphasis. 80% wanted scheduled time to be increased. All faculty members agreed that Interactive learning promotes relevance and helps create connections across various disciplines. There was positive rating of the integrated system of learning by a majority of students and an excellent rating of the system by the faculty.</td>
</tr>
</tbody>
</table>
model in North American medical schools basic sciences were not given enough importance and most of the clinically relevant knowledge was imparted in two sessions each consisting of four month. There was repetition and memorization of contents of lecture. Note taking compulsory attendance and text book studies which emerged in 1850’s were the learning strategies. General medical practitioners were faculty members and role models. The disadvantages of this model were wide variations in curricular quality from school to school and the caliber of instructors which was not standardized. Memorization was one of the primary learning strategy, teachers perceived that education based upon rote memorization has many disadvantages like inability to think critically and solve problems.

The situation of doctors graduating in the apprenticeship based curriculum was varied. Charles Elliot described the situation as the ignorance and incompetence of graduates when they receive the degree which lets him loose to practice on community as horrible. Towards the end of nineteenth century disciplined based curricular model started to be followed, in which there was a strong hold of subject specialists. Teachers then believed that there is a need for a strong knowledge base of basic sciences for the students, and before getting that knowledge base there was no clinical training during the first two years. This division is still present in medical curricula. There was emphasis on university housed departmental structure which was discipline based, this lead to increase in the quantity of knowledge which lead to new clinical applications. The primary instructional goal of this curricular reform was not to provide students with knowledge of facts but to polish their abilities to think critically and to become problem solvers and to keep up with changing times.

Abraham Flexner a famous research scholar at the Carnegie Foundation for the Advancement of Teaching took an assessment of medical education in America, he visited 155 medical schools in the United States and Canada. He reported: “Each day student was subjected to interminable lectures and recitations. After a long morning of dissection or a series of quiz sections, they might sit wearily in the afternoon through three or four or even five lectures delivered in methodical fashion by part-time teachers. Evenings were given over to reading and preparation for recitations. If fortunate enough to gain entrance to a hospital, they observed more than participated.” His report in 1910, addressed primarily to the public, helped change the face of American medical education. Flexner’s report influenced change in curriculum by criticizing the ordinary quality and profit motive of many medical schools and medical teachers, the inadequate curricula and facilities at a number of schools. Admission criteria, length of medical education in a medical school and exclusive basic science knowledge base of two years came into practice.

Strengths of this curricular design were a strong basic sciences knowledge base and the development of hypothetico-deductive reasoning skills which will serve as foundation for intellectual skills like self-directed learning and problem solving.

Major disadvantage of this curricular model (structure of discipline) was that students were not allowed to see real patients for the first two years, another important issue was sequencing of teaching in basic disciplines thus resting all the responsibility of integrating information on the students. Individual departments have control over the information and they wanted to produce mini scientists who by themselves will become scientific practitioners.

These disadvantages as appreciated and perceived by teachers and curricular experts lead to integrated curricula the organ-system-based model during 1950’s in which there was reduction in basic sciences details and integration of basic sciences information thereby avoiding unnecessary repetition of information.

In integrated curriculum education is planned in a way that it cuts across subject matter lines, bringing together different aspects of the curriculum into significant association to focus upon broad areas of study. It views learning and teaching in a holistic way and reflects the actual world, which is interactive.
During the same period the departmental barriers were lifted and curriculum was overseen by topic committees who were responsible for planning an educational program. Western Reserve School of Medicine gave the first organ system based model in which basic science teachers from various disciplines integrated their lectures using a single organ system as focal point. Clinical integration was achieved later when clinical case encounters were introduced in each organ system. With integrated curriculum student learning was maximized by teaching basic and clinical sciences integrated within an organ system. Students attain skills as self directed learning and problem solving; further integration will be achieved by the students when they start clinical training. Taking the control of curriculum from the departments and giving it to the curriculum committee ensures successful implementation throughout institution and by defining learning objectives performance expectations are also defined.

**Theme 2: Implementation of the integrated curriculum**

Since 1950 integrated curriculum; the organ system based model is followed worldwide it started from North America, most of the medical schools of Europe adopted the same reforms. Innovative curricula as practiced in different part of the world like Dundee UK, McMaster in Canada, Maastricht in Netherlands and Newcastle in Australia and many others follow Spices model of curricular reform as proposed by Harden. This model is a continuum from traditional to modern designs with newer schools tends to be more on the left of continuum.

Integration as opposed to discipline based curriculum is one of the important components of SPICES model. This started earlier than student centered and problem based approaches which actually are considered as a part of integrated curricula. It is the organization of teaching matter of different academic courses taught by different disciplines. Integration is accepted as one of the important educational strategy and eleven levels of integration have been described from total isolated teaching to complete integration that is trans disciplinary.

In isolation subject specialists arrange their teachings without considering for other disciplines, while in the awareness stage they are aware of what is covered in the other disciplines. In harmonization stage teachers consult with each other and communicate about their courses, this stage is described as “connection” disciplines remain separate but teachers make explicit connections like connecting topics in one session to earlier sessions. The next step is nesting; an integrated approach in which in a subject based course teacher introduces skills from another subject like a pathology course introducing aspects of clinical medicine. In temporal coordination timing of teaching topics of individual subjects is done with coordination of other disciplines. Example of temporal coordination is functions of the heart taught by physiologists at the same time when anatomists teach structure of the heart.

Sharing is the step six of the ladder in which two disciplines agree to plan and jointly implement a teaching program. In correlation step emphasis remains on disciplines, an integrated teaching session is planned in addition to subject based teaching. Complementary approach is step eight it has both subject based and integrated teaching, now more times is dedicated towards integrated teaching and focus of teaching is a theme or a topic.

Multidisciplinary approach brings together a number of subject areas in a single course with themes. The themes selected may function in a different ways, the themes can delineate an area in which practical decisions are to be practiced or a structured body of knowledge has to be mastered. In the step ten; interdisciplinary integration there is further shift of emphasis on themes as a focus of learning and to commonalities across disciplines.

In trans-disciplinary integration the focus of learning is field of knowledge as in the real world and not the themes or topics. Teacher provides the structure or framework of knowledge and integration takes place in the mind of learners.

There was a mixed response of teachers over the integrated curriculum, more of them perceived it having a positive impact on learning. The interest of control of information by topic committees as opposed to departmental control and organization of content around organ system was appreciated by teachers and experts. There were other perceptions among teachers like lack of context in the organ-system-based model does not enable the learner to understand better.

Organ-system-based model with integration of basic and clinical sciences in the curriculum is being practiced in regional countries also. A study from India about perceptions of Medical Teachers has concluded that teachers agree with implementation of curricular reforms.

Basic science and clinical teachers alike identify the need for greater integration in the curriculum. Exposure of students to real patients in first year and curriculum stimulating research are the areas of concern in the study. Teachers feel that quality of medical education is deteriorating and improvements need to be made in curricular planning, assessment and use of technology in medical education.

Integrated curriculum is practiced in another regional country that is Nepal and studies about the perceptions of students revealed concerns about certain basic sciences subjects to be removed from later part of semesters.

**Theme 3: Failed reforms to implement the integrated curriculum**

Structure of discipline model is followed throughout the medical colleges of our country. Community...
oriented medical education [COME] an organ-system-based curricular re- 
form was instituted by the govern- 
ment of Pakistan in 1992 taking lead 
from the Edinburgh Declaration asking 
the faculty and administrators of 
medical institutions to develop a re-
vised/new curriculum for use by all 
the medical institutions of the coun-
try. The World Health Organization 
(WHO) was contacted for assistance 
in this regard.

The COME project (as it was 
called) was initiated as a pilot in 
1994 in collaboration with the WHO 
by the Government of Pakistan. 
Four medical Colleges, one from 
each province were included in the 
program. They were Dow Medical 
College (Sindh), King Edward Med-
ical College (Punjab), Bolan Medi-
cal College (Balochistan) and Ayub 
Medical College (Khyber Pakhtoon 
Khwah). The faculty of medical col-
leges and the other stake holders 
were involved in revising the tradi-
tional curriculum with incorporation 
of COME in undergraduate teaching. 
The conceptual framework for the 
curriculum was taken from the spiral 
curriculum at the medical school of 
Dundee in United Kingdom.

The curriculum was developed 
during regular meetings of the fac-
ulty from these four colleges and 
launched in 2001. Three out of these 
four colleges piloted one to two first 
year blocks. However despite inten-
se efforts by the consultants, coor-
dinators, and the faculty, the COME 
curriculum could not be implement-
ed.

A study was initiated by WHO 
and Ministry of Health (MOH) in 
2004 to look into the factors, which 
hampered the implementation of 
the COME curriculum in the select-
ed colleges. The objectives of the 
study were to identify the reasons for 
non-implementation of the COME 
Project and to assess the under-
standing of the stakeholders about 
COME. Perceptions of faculty (med-
ical teachers), administrators and 
students were analyzed.7

A mixed method approach was 
used with both quantitative and 
qualitative study designs. Data col-
collection was done by detailed inter-
views, mail-in survey questionnaire 
and discussions with groups of stake-
holders.7

Three themes were identified 
after coding; institutional issues, 
programmatic issues and curricular 
issues. Majority (92% of the faculty) 
feared that COME curriculum could not 
be implemented without adequate 
infrastructure. The administrators 
were willing to provide financial as-
sistance, political support and bet-
ter coordination and felt that COME 
could improve the overall health 
system of the country whereas the 
faculty did not agree to it. The key 
issues identified in the study includ-
ed frequent transfer of faculty of the 
designated colleges and perceived 
lack of:

- Continuation at the policy mak-
ing level
- Communication between the 
stakeholders
- Effective leadership

This was the story of a failed 
curricular reform in Pakistan; never-
theless organ-system-based model is 
being followed with varied level of 
integration in many public and pri-
ivate sector medical colleges. There 
is no uniform policy at the state lev-
el to regulate educational reforms, 
one attempt made by the govern-
ment failed and there is no follow up 
program even after twelve years.7

The Pakistan Medical and Dental 
Council (PMDC) which is the regu-
larity body who has to take lead 
seems to be in a state of confusion as 
well, in the latest draft curriculum.27

The organ-system-based curriculum 
with horizontal and vertical integra-
tion is preferred & subject based is 
allowed. But just after that claim 
following whole document is subject 
based with no evidence or suggestion 
of integration. Information overload 
is being pointed out as a major chal-
lenge and it is written that the an-
swer is identification of core curric-
ulum with plenty of opportunities for 
electives, Unfortunately this is not 
being done in this curricular docu-
ment rather converse has been done 
with everything compulsory and 
nothing mentioned about electives.28

This has left this PMDC curriculum 
as data gathering and subject based 
only; therefore no way forward as 
far as overall responsibility of regu-
latory body is concerned.27

The literature review on teach-
er’s perceptions about integrated 
curriculum revealed that it is prac-
ticed worldwide with advantages 
over the earlier curricular reforms. 
Students have better insight of the 
subject matter and have their say 
in planning of curriculum. At the 
same time this curriculum could not 
be implemented without adequate 
infrastructure. The faculty, admin-
istrators and policy maker’s willing-
ness is also a prerequisite along with 
removal of financial constraints.

CONCLUSION

It is concluded that integrated 
curriculum in an organ-system-based 
model is a curricular reform that is 
well accepted by teachers around 
the world. It helped reducing the 
excessive information and repetition 
of content. In Pakistan an innova-
tive curriculum was formulated but 
unfortunately there was failure in 
implementation due to various rea-
sons. Role of regulatory body the Pa-
kistan Medical and Dental Counsel is 
insensitive towards the change. We 
have to remember that organ-sys-

tem-based model came into practice 
in 1950’s and now it’s 2014, hence 
we are far behind in medical educa-
tion.

ACKNOWLEDGEMENT

We acknowledge the study participants 
who took time out for this study and 
shared their views.

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Health Professions Education. IG facili-
tated in data collection and editing the 
drafts of this manuscript.
CONFLICT OF INTEREST
Authors declare no conflict of interest.

ETHICS APPROVAL
The approval/permission was obtained from Khyber Medical University Research and Ethics Board.

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