Preparation of Blue Prints for Formative Theory Assessment of Undergraduate Medical Students in Community Medicine

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Abstract

The written assessment of medical students is very important in view of assessing the various levels of cognitive domains. The validity of any assessment depends upon the appropriate constriction of assessment tool. Framing an ideal theory assessment tool that covers the whole syllabus with proportionate weightage to various content areas according to their importance is big challenge for the paper setter. Considering the vast nature of Community Medicine syllabus constructing a theory assessment tool as per above said ideals is still more difficult. Blueprinting of syllabus i.e. covering all the content areas with allocating proportionate weightage to various content areas can overcome this issue and helps the paper setter to construct a uniform and valid assessment tool. Department of Community medicine has constructed such two blue prints that can be used for either formative or summative type of theory examination.

Keywords: Blue Print, Specific Learning Objectives, Weightage of Content Areas

1. Introduction

One of the important job of medical teacher is to assess how much and how well the medical students have learned the subject. Thus assessment is a very important component of medical education and therefore, the assessment system is an integral part of the curriculum of a course[2].

At most of medical colleges or institutes, the traditional pattern of theory assessment tool of assessment is followed which may not follow the principles of assessment. Such traditional or conventional pattern of theory assessment tool in the medical education has many drawbacks such as subjectivity of paper setter, lack of uniformity, lack of pre-validation of theory assessment tool by peer reviewers and not stating SLO. (Specific learning objectives) The qualitative feedback from students after any theory examination often suggests that question paper is not framed appropriately, it has not covered whole syllabus, it has missed the important topics and it was very lengthy and time was not adequate for writing the answers[1].

Such type of scenario is common to almost all subjects of medical undergraduate course but it is still more common for the subject of Community Medicine; owing to the vast nature of syllabus[1]. Thus such types of errors results in a biased question paper and thus affects the assessment of medical undergraduate students. Blue printing in assessment can overcome this problems, if not completely, to a large extent and hence make assessment more valid[4].

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Blue print is a two way matrix that ensures that all aspects of the curriculum and educational domains are covered by assessment programs over a specified period of time. It is a chart which shows the placement of each question in respect of the objective and the content area that it tests[3]. In simple terms, Blueprint links assessment to learning objectives. It also indicates the marks carried by each question. It is useful to prepare a blue print so that teacher knows which question will test which objective and which content unit and how many marks it would carry[3]. The blue print concretizes the design in operational terms and all the dimensions of a question (i.e. its objective, its form, the content area it would cover and the marks allotted to it) become clear to the teacher. It may be a simple content matrix but it can also include further specifications, for example test and assessment methods. A comprehensive blue print, therefore serves as a reference framework for the question paper setter to prepare the question paper[1].

In view of this, authors prepared blue print for undergraduate syllabus of Community medicine.

2. Aims and Objectives

- To prepare the blue prints for undergraduate syllabus of the community Medicine in two parts i.e. paper I and paper II.

3. Methodology for Preparation of Blue Print of Community Medicine

3.1 Listing All Content Areas in the Syllabus of Community Medicine

All the content areas of community Medicine were listed in two parts of paper I and paper II according to MUHS guidelines as follows.

3.1.1 Paper I

Concept of health & disease, Sociology, Epidemiology, Bio-statistics, Communicable & Non- communicable diseases, Genetics and Environment health.

3.1.2 Paper II

Demography and family planning, Maternal and child health, Health planning and management, Occupational health, mental health, Health education, Health care delivery systems, National health programs, International health and Voluntary health organization, disaster management and Hospital waste management.

3.2 Skeleton of the Assessment Tool

As per the norms of MUHS guidelines total allotted mark to Community Medicine is 120 Marks. Thus each paper is of 60 marks (72 marks if Optional questions are included) Each paper will have following sections

Table 1. Skeleton of assessment tool

Sections	Question Pattern	No. of Questions	Marks	Marks if Options are included
A	MCQs	30	15	15
B	LAQs	03	24	24
C	SAQs	07 out of 11	21	33
Total		**44**	**60**	**72**

Thus as shown in Table 1 each paper will have a total of 44 items/questions carrying 72 marks out of which students has to attempt 60 marks.

4. Steps in Preparations of Blue Prints

4.1 Decide the Impact of Each Content Area and Allot an "Impact Score" (I) to Each Areas

The Impact score (I) ranges from 1 to 3. Impact score 1 has less public health importance & having "nice to know" content areas for students. Impact score 2 has moderate public health importance and "desirable to know" content area and impact score 3 has high public health importance and "must know" content areas for students.

4.2 List the Frequency of Asking Questions on that Content Areas and Give "Frequency Score" (F) to Each Content Area

Frequency score also ranges from 1 to 3. Frequency score 1 means less frequently asked question, frequency score 2 means moderate frequency of asking questions and frequency score 3 means high frequency of asking questions.

4.3 Decide Weightage of the Each Content Area (W)

Following steps were conducted for deciding weightage to each content areas.
a. Calculate I × F i.e. Impact of topic × Frequency of asking questions from each topic
b. Calculate total summation of all I × F and this will be

labeled as "T".

c. Weightage coefficient (W) will be calculated as I× F/T

d. Multiply the Weightage coefficient (W) by total no. of items i.e. 44. W× 44 will give us the proportionate weightage of each content areas

e. Calculate adjusted weightage of each content areas as per total marks i.e. 72

5. Results

Final blue prints were prepared. For Community medicine

paper I total (T) i.e. summation of all I× F is found out to be 47 and summation of all W× 44 is found out to be 41. So final marks to each content areas were adjusted against 41 as shown in Table 2. Thus total 72 marks community medicine paper I blue prints were prepared. Similarly for Community medicine paper II total (T) i.e. summation of all I× F is found out to be 51and summation of all W× 44 is found out to be 43. So final marks to each content areas were adjusted against 43 as shown in Table 3. Thus total 72 marks community medicine paper II blue prints were prepared.

Table 2. Blue print for Community Medicine paper I

Topic	Impact of Topic (I)	Frequency of asking Question (F)	I× F	Weightage W = I× F/T	W× 44	Final marks
Concept of Health & Disease	3	2	6	0.12	5.28 ~ 5	8.78 ~ 9
Sociology	2	1	2	0.04	1.76 ~ 2	3.51 ~3
Epidemiology	3	3	9	0.19	8.36 ~ 8	14.01 ~ 14
Screening	2	2	4	0.08	3.52 ~ 3.5	6.14 ~ 6
Biostatistics	2	2	4	0.08	3.52 ~ 3.5	6.14 ~ 6
Communicable diseases	3	3	9	0.10	8.36 ~ 8	14.01 ~ 14
Non Communicable diseases	2	3	6	0.12	5.28 ~ 5	8.78 ~ 9
Genetics	1	1	1	0.02	0.88 ~ 1	1.75 ~ 2
Environmental health	2	3	6	0.12	5.28 ~ 5	8.75 ~ 9
Total			T= 47		41	72

Table 3. Blue print for Community Medicine paper II

Topic	Impact of Topic (I)	Frequency of asking Question (F)	I× F	Weightage W = I× F/T	W× 44	Final marks
Demography & FP	2	2	4	0.07	3.08 ~3	5.02 ~ 5
MCH	3	3	9	0.17	7.48 ~ 8	13.39 ~13
Nutrition	2	2	4	0.07	3.08 ~ 3	5.02 ~ 5
National Health Programme	3	3	9	0.17	7.48 ~ 8	13.39 ~ 14
Mental Health	1	1	1	0.02	0.88 ~ 1	1.67 ~ 1.5
Health Education	1	2	3	0.05	2.2 ~ 2	3.34 ~ 3
Planning & Management	2	1	2	0.03	1.32 ~ 1.5	2.51 ~ 2.5
Health care Delivery	3	3	9	0.17	7.48 ~ 8	13.39 ~ 13.5
Occupational Health	3	2	6	0.11	4.84 ~ 5	8.37 ~ 8
International Health	1	1	1	0.02	0.88 ~ 1	1.67 ~ 1.5
Disaster Management	2	1	2	0.03	1.32 ~1.5	2.51 ~ 2.5
Hospital Waste Management	1	1	1	0.02	0.88 ~1	1.67 ~ 1.5
Total			51		43	72

6. Discussion

While preparation of blue prints it should also deal with under representation (CU) and irrelevant variance (CIV). Under representation refers to under-sampling or biased sampling of the content domain or the course contents and irrelevant variance means systematic error (rather than random error) introduced into assessment data by the unrelated variables. This means inclusion of flawed item formats, too easy or too difficult questions or examiner bias. The blue print makes the assessment clear, explicit and transparent to everyone involved in the process of learning. It makes assessment 'fair' to the students as they can have clear idea of what is being examined and can direct their learning efforts in that direction. Blueprints arising from these detailed specifications form an exact sampling plan for content domain to be tested. This forms the solid foundation for all systematic test development activity and provides evidence for the content related validity, thus making the assessment more meaningful[5]

7. Conclusion

Both the blue prints so prepared were peer reviewed by the other faculties/subject experts from the department of Community Medicine. There was a positive feedback from all of them. According to them, weightage of marks given to each content area was in accordance to their subjective consensus. Hence the blue print was approved for the use in formative or summative types of theory examination.

8. Recommendations

Since the blue print imparts objectivity, uniformity and validity to the constructions of written assessment tool, it should be used in practice. However in view of addition of new content areas to the syllabus blue prints should be revised or amended for every academic year. It also helps the teachers in designing the instruction as per the guidelines expected in the curriculum. It is also recommended that blue prints should be prepared by different subject experts every time and should be peer reviewed.

9. References

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