The objectives-based logbook
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Objectives for an internship Internal Medicine: from the Dutch Blueprint (Raamplan 1994) to implementation into a practical logbook


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Abstract

Background The Dutch Blueprint 1994 (Raamplan 1994) describes the objectives of undergraduate medical education. The Blueprint, developed in order to improve medical education in the Netherlands, is accepted by all Dutch medical schools and has been legislated.

Aim Translation of global objectives of the Blueprint into specific requirements of a Logbook (guideline and evaluation tool) for the internship Internal Medicine.

Description The Blueprint as such is impracticable as a guideline during the Internal Medicine internship. The content covers the objectives for the entire field of medicine, and the volume dedicated to Internal Medicine is too large to fit in with a twelve week internship. The practicability of the Blueprint leaves much to be desired because it is complex, and not easily accessible. So, the Blueprint was adapted on three points: (1) selecting those objectives out of the whole content, which are specifically relevant to Internal Medicine; (2) decreasing the volume Internal Medicine by clustering and defining the requirements; (3) making the Logbook usable as a guideline and evaluation instrument.

Conclusion The Logbook is a good starting-point to evaluate whether students meet the objectives of the Blueprint related to the discipline Internal Medicine.
Introduction

In the Netherlands there is an increasing demand to improve undergraduate medical education,\textsuperscript{1-5} aimed at among other things, the educational structure of the internships, assessment procedures, attitude development, and generally accepted final objectives. Efforts to improve medical education have resulted in the Dutch Blueprint 1994 (Raamplan 1994),\textsuperscript{1} which gives a description of the objectives of undergraduate medical education. All medical schools in the Netherlands have accepted the objectives of the Blueprint.\textsuperscript{4} Moreover, in December 1997 a substantial part of the Blueprint has been legislated in the 'law on professions in individual health care' (Wet op de Beroepen in de Individuele Gezondheidszorg -BIG-).\textsuperscript{5} As a consequence, Dutch medical schools guarantee that students who pass the final examinations, meet the requirements of the Blueprint. The final objectives described in the Blueprint are identical to the starting criteria for any postgraduate training such as in Internal Medicine.\textsuperscript{7}

All medical schools are using the Blueprint in one way or another.\textsuperscript{8-14} The faculty of Medical Sciences in Groningen has worked out the Blueprint for practical use in the internships, viz. discipline-related objectives that are specific for a particular internship as well as objectives that cannot be classified within a single discipline but are applicable to the entire field of medicine ('general objectives' and 'problems'). These latter objectives which are not specifically related to a single discipline, have to be obtained during the continuum of the whole medical curriculum.

This article is confined to the internship Internal Medicine. In short, it describes the translation of the discipline-related objectives of the Blueprint into specific requirements described in a Logbook, to be used in the internship Internal Medicine as a guideline for students, and as an evaluation instrument. The Logbook can be used as a guideline because the objectives are stated on paper. Thus, the students can commit themselves to these objectives, and consider them as important factors in their medical education. Students complete the Logbook by making records of what (clinical pictures and skills) and how (courses, bedside teaching, ward rounds, making a clinical record, seeing and performing a skill, feedback of supervisors) they learn. So, the
Logbook can serve as an evaluation tool for the student, the teacher and the medical school.\textsuperscript{15-18} Moreover, Logbooks have been also valuable in structuring the internship.\textsuperscript{18}

**The Blueprint**

The Blueprint offers a general description of the objectives prospective doctors have to meet in order to pass their final examinations.\textsuperscript{1} The objectives consist of three parts. The first part describes the general objectives in terms of knowledge, skills, and attitudes necessary to function as a good doctor. They pertain to medical aspects (the process of medical problem solving), scientific aspects (principles and meaning of science), personal aspects (doctor-patient relation, personal performance, the interaction of work and private life), and aspects of society and health care system (structure and function of health care, medical ethics, legal regulations, costs). The second part lists a total of 343 problems presented by patients (e.g. fever, headache, alteration of defecation pattern) that any doctor must be able to handle. These first two parts -general objectives and problems- are legislated by law. The third part contains objectives that are specific to eleven medical disciplines (Internal Medicine, Neurology, Gynecology/Obstetrics, Surgery, Paediatrics, Psychiatry, Dermatology, Ophthalmology, Otorhinolaryngology, General Practice and Social Medicine). These objectives are formulated as clinical pictures (e.g. myocardial infarction, pneumonia, gastroenteritis) and skills (e.g. auscultation of the heart, preparation and examination of urinary sediment, intravenous cannulation).

The list with clinical pictures also describes levels of knowledge ranging from theory to practical experience. Level 1 pertains to clinical pictures a student must be able to recognize. Level 2 sets out the clinical pictures a student must be able to cope with in clinical practice. Furthermore, this list indicates which disease has only to be diagnosed by means of physical examination, simple aids or additional investigations (level D), and which has to be treated (level T) by the student. The skills-list describes the actions and skills necessary to pass through the process which starts with the problem as presented by a patient, and contains skills of physical examination, diagnostic procedures, and therapeutic skills. The skills-list also defines four levels of competence. Level 1
indicates theoretical knowledge. Level 2 points out which skills the student has to demonstrate. Level 3 and level 4 respectively indicates that the student has practised the skill under supervision, and has experience in using and performing the skill.

The Blueprint has some characteristics which makes it not feasible in practice, related to the content, the volume, and the practicability. With respect to the content and volume: the Blueprint covers the entire field of medicine which is needed for the education of undergraduate doctors.\textsuperscript{1,19-26} Thus, this broadly-based document goes beyond the specific parts of the educational programme, such as for instance the internships. Moreover, the objectives which are described are very general, and should be worked out into more concrete terms.\textsuperscript{24-29} Inherent to the large content, is the large volume,\textsuperscript{25,26,28,30} which sets bounds to its use in practice. Moreover, the Blueprint is not practical to work with.\textsuperscript{24-30} The readability is poor and complex, so it is not easy to access. These unpractical characteristics of the Blueprint make it necessary to reconstruct it into a more applicable tool for specific parts of the educational programme such as the internship Internal Medicine.

\textbf{Transformation of the Blueprint into a Logbook for the internship Internal Medicine}

The following steps were taken to transform the Blueprint into a Logbook:

a. Determining the content. An internist, an undergraduate doctor and an educationalist selected those objectives from the Blueprint that are relevant for undergraduate medical doctors to learn during the internship Internal Medicine;

b. Determining the volume. The Logbook had to fit the initial selected objectives within a twelve week internship;

c. Making the Logbook applicable. The Logbook should serve as a guideline stating the objectives to be met. In addition, students have to make notes in the Logbook about their learning experiences, so it can be considered as an evaluation instrument.\textsuperscript{15-18} The students can use the Logbook as an instrument providing feedback concerning their progress, allowing them to correct weaknesses, and assuring them of accomplishments. The teacher
receives information about the students' progress and performance during the internship. The medical school can use the Logbook to evaluate the adequacy of its instructional programme.

The discipline-related objectives related to Internal Medicine are formulated as clinical experiences the student has to become familiar with. The importance of clinical experiences is clearly expressed by Sir William Osler: "to study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all". Clinical experiences are essential to competence during the clinical problem solving process. Expert problem-solving in medicine is based on a wealth of prior specific experiences and can be used during routine selection of problems by pattern recognition processes. Pattern recognition helps in selecting a matching diagnosis and is a process in which students should be trained during the internships. Extensive experiences with various clinical problems should be acquired by training the student in determining which information is pertinent, which clinical findings are relevant, and which of these data can be transformed into an appropriate hypothesis and conclusion (differential diagnosis).

**Determining the content, selecting the objectives, and the levels of knowledge**

Although relevant for Internal Medicine a number of clinical pictures and skills listed in the Blueprint were not included into the Logbook. For example, skills concerning physical examination (e.g. assessment of mental status, palpation of lymph nodes, auscultation of the lungs) are trained and examined during the Introduction course which precedes the internship. Other skills (e.g. histamine provocation test) and clinical pictures (e.g. Paget's disease of the nipple) were eliminated because they had no high priority to be learned during the internship Internal Medicine. In addition, skills (e.g. administering rectal medication) and clinical pictures (e.g. hypercholesterolaemia) which were considered relevant to be learned during the internship Internal Medicine are added to the Logbook. Clinical pictures which have similar symptomatology and pathogenesis are clustered together into smaller or larger groups (Table 1), and are hierarchically structured in a number of levels.
Table 1  In the left column are the 'cardiovascular disorders' as part of the discipline-related objectives of the Blueprint. In the right column the Groningen adaptation of the Blueprint in the Logbook. The clinical pictures with an asterisk are minimal requirements to be met during the internship.

<table>
<thead>
<tr>
<th>CARDIOVASCULAR DISORDERS IN BLUEPRINT</th>
<th>CARDIOVASCULAR DISORDERS IN LOGBOOK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 angina pectoris</td>
<td>I.1 angina pectoris</td>
</tr>
<tr>
<td>2 unstable angina</td>
<td>* 1 angina pectoris</td>
</tr>
<tr>
<td>3 myocardial infarction</td>
<td>* 2 unstable angina</td>
</tr>
<tr>
<td>4 imminent myocardial infarction</td>
<td>3 variants</td>
</tr>
<tr>
<td>5 cardiac aneurysm</td>
<td>I.2 myocardial infarction</td>
</tr>
<tr>
<td>6 heart failure</td>
<td>* 4 (imminent) myocardial infarction</td>
</tr>
<tr>
<td>7 cardio-respiratory arrest</td>
<td>5 cardiac aneurysm</td>
</tr>
<tr>
<td>8 mitral stenosis</td>
<td>I.3 heart failure</td>
</tr>
<tr>
<td>9 mitral regurgitation</td>
<td>* 6 left sided heart failure</td>
</tr>
<tr>
<td>10 tricuspid regurgitation</td>
<td>* 7 right sided heart failure</td>
</tr>
<tr>
<td>11 aortic stenosis</td>
<td>I.4 valvular heart diseases/congenital heart diseases</td>
</tr>
<tr>
<td>12 aortic regurgitation</td>
<td>* 8 mitral stenosis</td>
</tr>
<tr>
<td>13 other valvular heart disease</td>
<td>* 9 mitral regurgitation</td>
</tr>
<tr>
<td>14 ventricular septal defect</td>
<td>* 10 aortic regurgitation</td>
</tr>
<tr>
<td>15 atrial septal defect</td>
<td>* 11 aortic stenosis</td>
</tr>
<tr>
<td>16 sinus tachycardia</td>
<td>12 tricuspid regurgitation</td>
</tr>
<tr>
<td>17 supraventricular tachycardia</td>
<td>13 other valvular heart disease</td>
</tr>
<tr>
<td>18 atrial fibrillation</td>
<td>14 ventricular septal defect</td>
</tr>
<tr>
<td>19 atrial flutter</td>
<td>15 atrial septal defect</td>
</tr>
<tr>
<td>20 ventricular fibrillation</td>
<td>16 coarctatio aortae</td>
</tr>
<tr>
<td>21 sinus rhythm</td>
<td>I.5 arrhythmias</td>
</tr>
<tr>
<td>22 supraventricular extrasystole</td>
<td>* 17 sinus tachycardia/supraventricular tachycardia</td>
</tr>
<tr>
<td>23 ventricular extrasystole</td>
<td>* 18 atrial fibrillation/atrial flutter</td>
</tr>
<tr>
<td>24 bundle branch block</td>
<td>19 (supra)ventricular extrasystole</td>
</tr>
<tr>
<td>25 other arrhythmias</td>
<td>20 sinus rhythm</td>
</tr>
<tr>
<td>26 endocarditis</td>
<td>* 21 ventricular tachycardia/ventricular fibrillation/ a-systolie</td>
</tr>
<tr>
<td>27 pericarditis</td>
<td>22 bundle branch block (left and right)</td>
</tr>
<tr>
<td>28 myocarditis</td>
<td>* 23 atrio ventricular dissociation</td>
</tr>
<tr>
<td>29 cardiomyopathy</td>
<td>24 other arrhythmias</td>
</tr>
<tr>
<td></td>
<td>I.6 carditis and cardiomyopathy</td>
</tr>
<tr>
<td></td>
<td>* 25 endocarditis</td>
</tr>
<tr>
<td></td>
<td>26 myocarditis</td>
</tr>
<tr>
<td></td>
<td>27 pericarditis</td>
</tr>
<tr>
<td></td>
<td>28 cardiomyopathy</td>
</tr>
</tbody>
</table>
The highest level is the category of illness (e.g. cardiovascular disorders) which is composed of several clusters (e.g. angina pectoris, myocardial infarction, heart failure, valvular heart diseases/congenital heart diseases, arrhythmias, carditis and cardiomyopathy). The clustering is made by using different criteria including localization, organ-system, type of disorder, pathogenesis, symptomatology, or treatment. Each cluster consist of a number of clinical pictures.

Inherent to the clinical pictures and skills are the levels of knowledge which the Blueprint handles. Because these levels do not correspond with our daily practice, they are also translated. This means that the four levels of knowledge regarding the clinical pictures in the Blueprint are translated into three levels in the Logbook. Level 1 (‘courses/lectures’) in the Logbook is a theoretical level, which corresponds with level 'I' in the Blueprint. Level 2 and 3 in the Logbook are practical levels. Level 2 (‘bedside teaching, ward rounds’) in the Logbook corresponds with level '2' in the Blueprint, which means that the student has to cope with the clinical picture in practice. Level 3 (‘making a clinical record’) in the Logbook corresponds with level 'D' and level 'T' in the Blueprint, which means that the student analyzes and engages personally patients' problems by going through the diagnostic ('D') as well as the therapeutic ('T') process, and makes a report.

The four levels with respect to the skills in the Blueprint are translated into two levels in the Logbook. Level 1 in the Logbook means that the student has had demonstrated or seen the performance of the skill in question. This level corresponds with level 2 in the Blueprint 'seen or have had demonstrated'. Level 2 in the Logbook (experience in using and performing the skill) corresponds with level 3 ('apply/perform'), as well as with level 4 ('routine') in the Blueprint. Level 1 in the Blueprint is a theoretical level, and is ignored in our Logbook.

**Determining the volume**

Because the number of clinical pictures and skills selected was too large to fit into a twelve week internship (it could not be guaranteed that all students would be able to fulfill all requirements), a second selection had to be performed on how many and which types of clinical pictures and skills students should experience. The number of experiences is based on an estimation of what is
feasible during a twelve week internship. The types of experiences students should have, are based on figures with respect to incidence and prevalence. To guarantee that students get a wide representation of the relevant clinical pictures, it was decided that at least one clinical picture out of a cluster should be met by every student (Table 1). By selecting such clinical pictures, emphasis was placed on 'prototypes'. A prototype is a hypothetical construction of the most typical example of a category (cluster) (e.g. aortic stenosis is more typical for valvular heart diseases than coarctatio aortae).\(^{39,42}\) A prototype includes the major characteristics of a cluster, but it is not necessary that all characteristics of a cluster are represented by one prototype.\(^{42}\) The number of clinical pictures students should have experiences with could be reduced from 29 cardiovascular disorders described in the Blueprint (left column Table 1) to 14 described in our Groningen Logbook (right column Table 1).

**Applicability**
The Logbook should be applicable as a guideline. For the students it is important to commit themselves to the objectives on paper. This forces them to consider many factors important in their medical education, and to be responsible to their study priorities. Secondly, the Logbook is also applicable as an evaluation instrument. Students complete the Logbook by making records of what (clinical pictures and skills) and how (courses, bedside teaching, ward rounds, making a clinical record, seeing or performing a skill, feedback of supervisors) they learn. Figure 1 shows an example of the Logbooks' design.

Because the Logbook provides insight into the clinical experiences of students, it serves as an evaluation tool.\(^{15-18}\) The students use it as a tool providing him or her immediate feedback concerning their progress, allowing them to correct weaknesses and assuring them of accomplishments. The teacher uses the Logbook to document the students' progress. The medical school uses the Logbook to evaluate its instructional programme, by registration of common deficiencies among the students that may reflect inadequacies in the curriculum or in the teaching-learning approach that is being used.
**Figure 1** An example of the Logbooks’ design. On the left side are the clinical pictures of what students should have met during the internship (those with an asterisk are minimal requirements). The columns with scores on the right side represents the number of students’ experiences in (1) courses, (2) bedside teaching/ward rounds, and (3) making records. They also score the numbers of their experiences. The last column ‘supervisor’, refers to the feedback which a supervisor gives a student.

<table>
<thead>
<tr>
<th>Renal Disorders</th>
<th>Theory</th>
<th>Inpatient/Outpatient Clinic</th>
<th>Supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidneys: functional diseases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* acute renal failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* chronic renal failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* nephrotic syndrome</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>polycystic kidneys</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>renal osteodystrophy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infections-Inflammations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* glomerulonephritis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pyelonephritis</td>
<td>etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A final important aspect is the validity of the Logbook. Validity refers to the question whether an instrument measures what it should measure. The content of the Logbook was considered valid after the seven members (internists) of the educational committee of the department of Internal Medicine discussed the different aspects of the Logbook extensively, and reached consensus about the selected objectives, requirements and applicability.

**Discussion**

Because the Blueprint (Raamplan 94) is considered an insufficient tool to evaluate the educational aspects of the internship Internal Medicine, a more appropriate tool was developed. Although the medical schools have their own individual responsibility to fit their educational programmes to the Blueprint, it is important to underline our deviation from some basic principles of the Blueprint.
The Blueprint presents the objectives in three parts: the ‘general objectives’ and ‘problems’ which are legislated, and the ‘discipline-related objectives’. The ‘general objectives’ and ‘problems’ are presented in an integrated way, and are generally applicable to the entire field of medicine. This integrated body of knowledge is also a key concept of problem-based learning.\textsuperscript{15,32} Although we have a problem-based learning curriculum in Groningen, we did not set out the objectives in an integrated way, but formulated the discipline-related objectives (clinical pictures and skills) for the internship Internal Medicine, because these objectives are specific to Internal Medicine. The other objectives (general objectives and problems) do not belong to a single discipline and should therefore be worked out during the whole educational programme, from year one to six. An examination which is derived from these integrated objectives is the Groninger Progress Test.\textsuperscript{44} Moreover, we especially worked out the discipline-related objectives because these objectives are used to ensure that students face broad clinical experience in order to learn the clinical reasoning process. If clinical problem solving is the key to learning, students should examine many patients with different clinical pictures.\textsuperscript{45}

Although only the discipline-related objectives were worked out in a Logbook, this does not mean that the general objectives and problems are neglected. Knowledge, skills and attitudes related to clinical problem-solving are described in the Blueprint as general objectives with regard to medical functioning. Paying attention to the clinical pictures and skills also means that integrated general objectives, such as clinical problem-solving, are elucidated. In other words, this part of the Blueprint is implicitly also part of the Logbook. Students classify their clinical experiences with clinical pictures, which means that the student has gone through different processes (such as history taking, physical examination, additional investigation, reporting and making records) in order to solve the problem of the patient. Thus the discipline-related objectives which are formulated as objectives of the internship Internal Medicine also include more integrated objectives such as clinical problem-solving.\textsuperscript{46} The three other parts of the general objectives (scientific, personal, social aspects) are not integrated into the Logbook for Internal Medicine, because in other parts of our educational programme, such as the scientific training, the scientific elective course and the clinical medical ethical conferences, the students are trained in these general objectives.
Paying attention to the clinical pictures and skills also means that the list of problems are implicitly part of the Logbook. When students have an encounter with for instance a patient with Hodgkin's disease, they come into contact with a lot of 'problems', as described in the Blueprint, such as loss of weight, loss of appetite, fatigue, general feeling of illness, fever, abnormal perspiration, enlarged lymph nodes -general and local-, swelling in the neck, swelling in the axilla, and swelling in the groin. Another reason to formulate clinical pictures and skills instead of problems as the objectives of the internship, is related to the evaluation function of the Logbook. The Logbook is supposed to be used as an evaluation-tool. Students, teachers and the medical school can use it as a reference for the evaluation of students' learning experiences. Learning experiences related to clinical pictures allow students and teachers/medical school to have a better insight into the knowledge regarding pathogenetic aspects of clinical pictures. This basic knowledge may give more meaning to the discussion about the experiences with clinical problem-solving. If students should relate their learning experiences to problems only, it would be hard to discuss the clinical reasoning process because cause and consequence about the diagnosis cannot be deduced immediately. Moreover, in the clinical reasoning process the problems are interrelated and not separated, such as stated in the Blueprint.47

In the translation of the Blueprint into the Logbook, the four levels of knowledge which are mentioned with respect to the discipline-related objectives are not exactly copied, but are translated into three levels to acquire knowledge ((1) courses; (2) ward rounds, bedside teaching; (3) compiling clinical records), because the distinction between the levels in the Blueprint is too strict, and not compatible with our clinical practice in Groningen.9,10 Students' experiences sometimes exceed the requirements of the Blueprint, and sometimes their experiences fall short. For instance, the Blueprint specifies that the skill 'pleural tap' should be known only at a theoretical level (level 1), but most students (70%) reported that they had observed the performance of the skill several times (level 2), which clearly exceeds the minimum. Similar results were found with respect to the clinical experiences: some students went through complete diagnostic (level D) or even therapeutic processes (level T) with clinical pictures in circumstances recommended by the Blueprint to be adequately covered by only
theoretical knowledge (level 1). So, the level of knowledge should correspond with that in daily practice.

A final aspect to consider refers to the scope of the Logbook in practice. The Logbook was developed because it is necessary to evaluate whether the students meet the national requirements. Although we do have a Logbook now, the appropriateness of it as an evaluation instrument should be assessed.\textsuperscript{48,49} This means that further research on the qualifications of the logbook such as reliability, feasibility and scoring should be the next step.

\section*{Conclusion}

The content, the volume and the practicability of the Blueprint were adapted and turned into a Logbook for students during the internship Internal Medicine. The Logbook states the clinical experiences (clinical pictures and skills) which students have to meet. Herewith, the Logbook serves both as a guideline and as an evaluation-tool of the internships. The Logbook is a good starting point to evaluate whether students meet the requirements of the Blueprint. After implementing it, analysing the qualities (reliability, feasibility, acceptability) of the Logbook and the conditions (facility, capacity and utilization) under which the Logbook functions is the next step.

\section*{References}


