The authors have developed and implemented a methodology for evaluation of students' clinical performance through learning contracts. Their system incorporates a multidimensional approach including: (1) daily evaluations; (2) inservice examinations, and (3) individualized learning options. The authors provide details on the process of implementing this system, which was found to be a comprehensive yet flexible alternative to traditional methods of student performance appraisal.

It is a rare, if not highly suspect faculty who can maintain that their evaluation system of student clinical performance is without fault. Most of us would be less vehement in these claims and admit that while the system appears adequate, room for improvement clearly exists. Frequently, however, faculty fail to realize the extent of the discrepancy or the signs that preclude the recognition of an ineffective performance appraisal tool.

Students remain our best barometer of functional evaluation problems. Their claims that performance feedback is often incomplete, prejudicial, subjective, and lacking in appropriate validity measures may in part be correct. The indicators may be more subtle, manifesting themselves as generalized student frustration or lack of demonstrable or consistent learning progress. Whatever signals may appear, the preeminent responsibility of faculty is to guide students through a curricular plan that draws as its main source of validity a credible, functional and responsive system of clinical evaluation.

The task of devising such a system is not an easy one. Its final form will represent the input of faculty, students, and educational experts, and will reflect the unique environmental features of the clinical setting. This article chronicles the development of a new approach to clinical evaluation at the University of Kansas that utilized the learning contract method to meet the challenges of improving clinical evaluation for students.

Learning by contract

In its broadest application, a performance contract is defined as a formal agreement, usually written, which is drawn by two parties stipulating the level of performance or competency one expects the other to achieve. Within the context of this article, the two parties are the student and the instructor, and the competency measures are those criteria based skills that are required of the nurse anesthetist in preparation for professional practice.

Contractual learning is only one of many variations on the theme of performance contracts. Educational jargon has given this method of learning other familiar names, including competency based education, achievement testing, education by objectives and accountability learning. All share a similar philosophy, even though the mechanics
may vary depending on the educational purpose to be served.

The concept of performance contracting is not new to education. Historically, Martin and associates maintain it is one of the most widely used and abused pedagogic methods of the last century. Its ideological origins are fixed in the nineteenth century philosophies of positivism advocated by Comte and Mach. Their philosophy held that epistemological theory was valid only when manifest by observable phenomenon. In other words, a student has achieved learning only when he is able to demonstrate an observable, quantifiable or measurable behavior change. Several early twentieth century American educators employed this philosophy as an expedient way to cope with a variety of educational problems, among them declining budgets and the inability of immigrant children to be accommodated by the American educational system. Their response was to contractually predicate teacher salary, school budget and general educational resources on student performance. This practice, later termed the efficiency model, was borrowed directly from business and industry which had adopted it largely in response to the burgeoning of American industry during the early decades of this century. Educators espousing this logic firmly believed that both the cost and quality of education would best be served when resource allocations were based on measurable and demonstrated levels of student achievement.

Educators of our generation are most familiar with these concepts in the form of the accountability movement of the 1970's. Downward economic trends and a generally negative response to the laissez-faire attitude of American colleges and universities of the late 1960's contributed to renewed interest in the accountability movement. In spite of its potential for instructional exploitation, performance contracting remains a viable and useful alternative to the challenge of measuring clinical progress.

Clinical contracting

In clinical education there are many skills required of the student anesthetist that are observable, and to a large extent measurable. For these skills, performance contracting proves to be not only applicable, but highly desirable as a method of achieving competency levels in carefully selected learning domains. Although factors that promote effective clinical teaching have not received as much attention by researchers as parameters measuring effective didactic instruction, performance contracting has been found to be a suitable vehicle for student evaluation.

There are several characteristics inherent to contractual learning which lend themselves particularly well to the process of educating the professional student. Pratt and McGill maintain that ineffective teaching usually results when student/instructor roles and expectations are not well defined or expressed. A negotiated contract may help obviate this problem by allowing the student more freedom to focus on the learning experience rather than on how to best satisfy assumed or ambiguous faculty expectations. Secondly, professional students are adult learners, and as such are usually self-directed, well motivated to learn, take an active part in planning their activities and bring a significant amount of knowledge to the clinical setting. Lord and Palmer note that contract learning accommodates those characteristics well by providing an appropriate balance between structure and freedom—structure to provide for the necessary acquisition of skill and knowledge, and freedom to allow for creativity and independence. Contract learning promotes individualized instruction by allowing students to move at their own learning pace and providing learning options that would be applicable to their interests or level of clinical expertise. Most importantly, the contract will sharpen student skills of negotiation, self-evaluation, and professional responsibility, all of which are mandatory attributes of the professional practitioner.

Developing the clinical contract

The initial stages of planning the performance contract were concerned with outlining the goals of the evaluation system based on the tenets of our program philosophy. Faculty roundtable discussions generated the following goals:

**Goal 1:** Clinical education should be a student-centered activity in which learning responsibilities are shared equally by faculty and students.

**Goal 2:** The learning process should accommodate opportunity for individualized instruction and attention to students' interest areas and particular abilities.

**Goal 3:** Students should have input and control over their evaluations. They should maintain control by assuming responsibility for outlining a portion of their learning experience, including its implementation and evaluation.

**Goal 4:** Evaluation should serve to nurture the students' skills of scientific inquiry and measure the acquisition of knowledge.
Goal 5: The clinical evaluation should include controls to allow for its use by a number of faculty members to minimize evaluator bias.

The contract consisted of three components: a daily clinical evaluation, inservice examinations, and a learning option. (The components are discussed in more specific terms later in this article.) During the first two weeks of every semester, a student would contract with a sponsoring faculty member for a grade of “A,” “B,” or “C.” Each grade incorporated performance criteria for each of the three components. Grades were then assigned for the semester based on whether the student achieved the criteria level stipulated by the grade he or she selected. Protocols were developed to describe contingencies that might affect the contract; these were included in an administrative manual distributed to the students and faculty prior to their exposure to clinical training. An example of a learning contract is shown in Table I.

### Table I
Learning Contract for the Clinical Grade

<table>
<thead>
<tr>
<th>Student:</th>
<th>Advisor:</th>
<th>Date:</th>
</tr>
</thead>
</table>

This contract is engaged to develop and outline the requirements for the grade of “A,” “B,” or “C” in the clinical experience.

Successful completion of each criterion is required to receive the grade that is being contracted for.

**GRADE CONTRACT “A”:**
1. 3.5 minimum on daily clinical evaluation
2. 85% minimum on clinical in-service examination
3. fulfill one learning option as outlined in the Faculty/Student Guidelines Book

**GRADE CONTRACT “B”:**
1. 3.25 minimum on daily clinical evaluations
2. 80% minimum on clinical in-service examination

**GRADE CONTRACT “C”:**
1. 3.0 minimum on daily clinical evaluations
2. 75% minimum on clinical in-service examination

I have met with my Faculty Advisor and we have reached a consensus on my Learning Contract. I now engage the Learning Contract for (check the appropriate contract selection):

- The letter “A” in the clinical area
- The letter “B” in the clinical area
- The letter “C” in the clinical area

I am fully aware that each of the items must be fulfilled to receive the contracted grade.

I am scheduled for the following rotations this semester:

1. ____________________________ 3. ____________________________
2. ____________________________ 4. ____________________________

(The Objectives Examination and the Learning Contract Option will reflect these rotations)

If a Learning Contract option is being utilized, please provide a brief description of your proposal:

_____________________________________________________________________

Student Signature: ____________________________ 1 copy—Student
Advisor Signature: ____________________________ 1 copy—Advisor
| Table II  
**Clinical evaluation**  
(13-24 months) |
| Please circle one: | Name: | Date: | Staff: | Procedure: |
| NA—not applicable | | | | |
| 2—below average (warrants comment) | | | | |
| 3—average | | | | |
| 4—above average | | | | |

**Preoperative**
1. Quality and comprehensive care plan: NA 2 3 4
2. Completes preoperative documents: NA 2 3 4
3. Timely consult with staff: NA 2 3 4
4. Equipment functional/drugs organized: NA 2 3 4
5. Theoretically justifies primary/alternate plans: NA 2 3 4
6. Appropriate use of invasive monitoring: NA 2 3 4
7. Demonstrates facility in line placement: NA 2 3 4
8. Comprehensive understanding of potential complications: NA 2 3 4

**Intraoperative**
1. Induction organized and sequential: NA 2 3 4
2. Clinical decisions theoretically based: NA 2 3 4
3. Facility in airway management technique: NA 2 3 4
4. Appropriate charting: NA 2 3 4
5. Effectively communicates with staff: NA 2 3 4
6. Conversant in pharmacokinetics/dynamics of anesthetic agents and adjuncts: NA 2 3 4
7. Effectively deals with complications: NA 2 3 4
8. Monitors/modifies anesthetic based on appropriate clinical criteria: NA 2 3 4
9. Performs complex management skills expeditiously and in priority: NA 2 3 4
10. Demonstrates increasing autonomy: NA 2 3 4
11. Knowledge of contemporary literature: NA 2 3 4
12. Professional behavior/role model: NA 2 3 4
13. Utilizes criticism constructively: NA 2 3 4

**Postoperative**
1. Reports to PAR personnel: NA 2 3 4
2. Plans/implements postop management with staff: NA 2 3 4
3. Attends to psychological needs of emerging patient: NA 2 3 4
4. Ensures continuity of care in PAR/ICU: NA 2 3 4
5. Teaching capability with others: NA 2 3 4
6. Effectively utilizes MDA as consult: NA 2 3 4

**Anesthesia Care Plan**
- **Age**
- **Wt**
- **Status:** 1 2 3 4 5 6
- **Allergy**
- **Consent:** __Yes__ __No__
- **Premed**
- **Position**
- **Blood ordered**
- **Medications:**
- **Lab data:**
- **Other:**
- **Significant Anesthesia/Surgical History:**
- **Significant Medical History:**

**Systems Review:**
- **Airway/pulmonary:**
- **C/V:**
- **Renal/metabolic:**
- **Hepato/hematologic:**
- **Neuro:**
- **Diagnoses:**

**Proposed Anesthetic Management:**
- **Induction Agents**
- **Maintenance Agents**
- **Relaxants**
- **Reversals**
- **Adjuncts**

**Technique:**
- **Bain**
- **Closed**
- **SCCS**
- **NRB**
- **Mask**
- **ETT**

**General**
- **Loc standby**

**Regional:**
- **type**
- **agent**

**Ventilatory management:**
- **TV**
- **MV**
- **VO2**

**Respirations:**
- **SR**
- **AR**
- **CR**

**Fluid management:**
- **EBV**
- **ABL**
- **NPO**
- **Maint**
- **3rd space**

**Total:**
- **Hr 1**
- **Hr 2**
- **Hr 3**

**Fluid type**

**Special procedures/monitoring:**
Component I: Daily clinical evaluations

The daily clinical evaluation utilized a criteria-referenced tool developed from learning objectives for students at three phases in the clinical program (0-6, 7-12, and 13-24 months). Table I shows the daily clinical evaluation for a student at the 13-24 month level. Criteria for students in the 0-6 and 7-12 month levels were similar in many respects to those for students in the 13-24 month levels, but reflected a lesser sophistication on the part of the beginning students as well as lowered faculty expectations with regard to clinical facility.

Each criterion skill was considered a minimum competency that students should demonstrate during that particular training phase. Items were explicitly written to minimize evaluator bias and facilitate consistent application by faculty members.

In other nurse anesthesia educational programs utilizing learning evaluation tools, it has been observed that beginning students move quickly and recognizable through early learning stages. However, the more advanced the student, the more ambiguous and less quantifiable progress becomes. If the student progresses in a normal manner, increased time in the program should correspond to increased competency levels. Clear demarcations between competency levels are usually subtle and consequently difficult to evaluate. This fact contributed to the development of the learning option (Component III, which will be discussed later) to assess the proficiency of senior students in higher order thinking processes such as critical analysis, abstraction and concept formation.

Daily evaluations were completed by faculty members during postoperative conferences with each student. Each evaluation was based on eight hours of a student's clinical performance (often involving several cases.) At semester's end, faculty randomly selected 30 evaluations of each student and obtained a numerical average. This average was used to determine whether the student had achieved the minimum level of clinical performance for the desired grade as stipulated in the learning contract.

Component II: Clinical in-service exams

To afford an assessment of theory-based knowledge in the clinical setting, a data bank of clinical questions was developed and categorized by content into 16 areas of clinical practice (Table III). All questions were derived from clinical objectives and supported by the literature. Each semester, students were tested over four areas related to their assigned monthly rotations. This sequence was devised to provide optimal continuity between theory and practice and to ensure exposure to all areas of clinical practice.

All students had the option of repeating one examination (with different questions) in order to achieve the performance criteria stipulated in the learning contract.

Component III: The learning option

Students contracting for the “A” grade were required each semester to fulfill one of ten learning options (Table IV). These options were developed to provide a flexible structure for individualized learning. Projects were initiated, developed and evaluated by the student in concert with an assigned faculty member. The student was obligated to choose an option that related to one or more of his or her rotations to broaden the scope and depth of study. Students were encouraged to use the learning option to further investigate an area of personal interest, as well as to nurture their skills of scientific inquiry.

Students submitted a brief outline of their proposed learning option within two weeks of the semester's start. Majority faculty approval of the project was required, while final evaluation was left to the student's faculty advisor. Examples of options chosen by students included major oral presentations, hospital-wide in-services, presentations of research abstracts at university research symposia, teaching in community service projects, student recruitment in high schools, advanced cardiac life support instruction, clinical research and grant proposal writing.

In retrospect

The University of Kansas has been involved in this novel approach of evaluation of clinical

<table>
<thead>
<tr>
<th>Table III</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Areas of clinical practice from which content material for in-service exams was derived</strong></td>
</tr>
<tr>
<td>Labor and delivery</td>
</tr>
<tr>
<td>Gynecology</td>
</tr>
<tr>
<td>Regional blocks</td>
</tr>
<tr>
<td>Clinical monitoring</td>
</tr>
<tr>
<td>Orthopedics</td>
</tr>
<tr>
<td>Urology</td>
</tr>
<tr>
<td>General surgery</td>
</tr>
<tr>
<td>Ophthalmology</td>
</tr>
<tr>
<td>Recovery room</td>
</tr>
<tr>
<td>Trauma</td>
</tr>
</tbody>
</table>
performance for the last two semesters. Certain faculty observations of the process may prove valuable.

The daily evaluation form proved to be successful to the extent that faculty and students were committed to its use as a mechanism for feedback in the immediate postoperative period. In these evaluation conferences, scoring was made by faculty alone or by the student performing a self-evaluation. Frequently, evaluation forms were accompanied by comments which clarified, interpreted or justified particular observations. Subjective interpretation of criteria, although not eliminated, was effectively channeled by selecting performance criteria that clearly described observable behaviors of students.

In view of the fact that clinical grades were based only in part on these tools, students were less likely to belabor the issue of evaluation subjectivity, instead accepting the daily score as a single faculty interpretation rather than a definitive statement of their competency. Consequently, emphasis was on the value of the evaluation to learning.

The development of in-service exams proved to be an exhaustive task. Considerable faculty time was devoted not only to question development but to mechanisms for their periodic review, research and validity/reliability testing. Without the aid of a computer for data bank storage and random retrieval, the amount of time spent on this venture alone would have been prohibitive. Word processing capabilities for both secretarial staff and faculty greatly enhanced the process of test develop-

<table>
<thead>
<tr>
<th>Table IV Learning contract options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Option Description: Annotated Bibliography</td>
</tr>
<tr>
<td>Criteria Assessment: Fifteen quality citations per APA guidelines must be relevant to the clinical objectives and represent a diverse range of resources.</td>
</tr>
<tr>
<td>2. Option Description: Clinical Test Bank Questions</td>
</tr>
<tr>
<td>Criteria Assessment: Fifteen multiple choice questions with four answer alternatives. A one-paragraph rationalization/explanation of correct response with appropriate references should be included for each question.</td>
</tr>
<tr>
<td>3. Option Description: Major Topic Presentation</td>
</tr>
<tr>
<td>Criteria Assessment: 45-minute, in-depth treatment of a relevant clinical topic to include evidence of critical thought. Written objectives, instructional aids, and a pre/post test are required.</td>
</tr>
<tr>
<td>4. Option Description: Journal Club Sponsorship</td>
</tr>
<tr>
<td>Criteria Assessment: Conduct journal club for three sessions in conjunction with the Clinical Coordinator. The student must demonstrate comprehensive knowledge of topics presented with evidence of critical analysis, intellectual direction, and be conversant with existing literature.</td>
</tr>
<tr>
<td>5. Option Description: Scholarly Endeavor</td>
</tr>
<tr>
<td>Criteria Assessment: Scholarly paper submitted for publication in a refereed journal.</td>
</tr>
<tr>
<td>6. Option Description: Major Topic Paper</td>
</tr>
<tr>
<td>Criteria Assessment: Comprehensive analysis of a clinical topic demonstrating a review and synthesis of the classical and contemporary literature.</td>
</tr>
<tr>
<td>7. Option Description: Scientific Investigation</td>
</tr>
<tr>
<td>Criteria Assessment: Participation in clinical research. Project must demonstrate the understanding and use of appropriate principles of scientific inquiry and methodologies.</td>
</tr>
<tr>
<td>8. Option Description: Community Service Project</td>
</tr>
<tr>
<td>Criteria Assessment: Project planned and implemented to address an educational/social need of the community that can be served by the expertise and knowledge of a nurse anesthetist.</td>
</tr>
<tr>
<td>9. Option Description: Paper Presentation</td>
</tr>
<tr>
<td>Criteria Assessment: Participate as a presenter in a symposium, meeting, research day, or other educational/dissemination seminar.</td>
</tr>
</tbody>
</table>
ment and distribution. The students' predilection for justifying their wrong answers proved a valuable learning tool, because many spent as much time as faculty searching library shelves for the "real" truths.

The learning option stands alone as the most enlightening component of the evaluation process. Although most students contracted for the "A" grade, which necessitated performing a learning option, there was wide variation in the quality of work. In general, those students who performed well clinically were the most creative and diligent in the selection and implementation of their learning option. Some of the most successful included the development of a multimedia recruitment presentation to high school students, an onsite exam of a sabotaged anesthesia machine pitting juniors against seniors (juniors won), a nationwide study on self-esteem factors of nurse anesthesia students, published clinical research and the presentation of research abstracts at university research symposia. Faculty sponsorship of these projects taxed the most adept instructor because advising skills, research expertise, resource identification and knowledge of university and community public relations were all called into play. The professional growth of faculty members in the end rivaled that of students.

It was the experience of our faculty that the use of learning contracts for student evaluation was an equitable and productive mechanism for performance appraisal. Learning again became the rightful responsibility of students, and competent guidance in teaching, the responsibility of faculty. Students were allowed an element of learning freedom, and mutual expectations that faculty and students have of one another were clarified.

Most importantly, the triad of performance components provided a more comprehensive mechanism of assessing student performance than the traditional single dimension rating scale. The commitment of contracting parties yielded additional benefits in the form of increased student motivation and learning, expanded program exposure within the university and community, and professional development of faculty.

REFERENCES

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