Improving the Clinical Instruction of Student Technologists*

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Many nuclear medicine technologists (NMTs) are employed in departments affiliated with programs that prepare individuals to become NMTs. These departments are sites where students receive hands-on clinical experience. The NMTs who staff these departments serve as clinical instructors whose responsibilities include teaching students the skills, attitudes, and knowledge necessary to become competent technologists. Clinical instructors often have no formal preparation in teaching or evaluating students. The purpose of this article is to review some principles related to teaching and critiquing clinical performance that will help clinical instructors support and foster the professional development of student technologists. After reading this article, the reader should be able to (a) identify the qualities of an effective clinical instructor, (b) identify the characteristics of constructive feedback, (c) identify appropriate times for evaluation and feedback, and (d) use facilitation skills when providing feedback and evaluating student performance.
Key Words: clinical evaluation; clinical performance; constructive feedback

Clinical instruction is a set of planned experiences designed to help students acquire skills, attitudes, and knowledge by participating in the work setting (*1*). Although the acquisition of skills is typically what comes to mind when the term "clinical instruction" is used, it involves more than just teaching the technical aspects of motor skills. In addition, clinical instructors teach attitudes by role modeling as well as help students relate classroom teaching to clinical practice.

Clinical education is a form of experiential learning. It is active learning by doing (*1*). Brown identifies 3 stages of experiential learning (*2*). In the early stage, students concentrate on learning technical skills. As they perfect their technical skills, the emphasis turns to learning how to function as a professional by observing how other professionals perform in their roles and by developing values and attitudes associated with the professional role. In the last stage, students begin to set their own learning agendas and choose their own learning experiences. Near the end of the clinical experience, students have become more independent and more self-directed in what and how they need to learn. Clinical instructors play an essential role in the students' progression from being directed in the acquisition of specific technical skills to becoming self-directed professionals.

Clinical evaluation is a key component in the educational plan for preparing future nuclear medicine technologists (NMTs). An educational plan identifies what students will do (clinical performance), how they will be assessed, and the criteria for acceptable performance. The evaluation component of the plan is intended to determine whether students are mastering the goals of the clinical experience designed to prepare competent practitioners. Students need to know if they have been successful in achieving the stated objectives as do program officials, future employers, and external agencies such as professional certification boards and accrediting agencies.

QUALITIES OF AN EFFECTIVE CLINICAL INSTRUCTOR

Clinical instructors are essential members of an NMT program's teaching staff; no program could exist without them. Numerous authors have examined the desirable attributes of effective clinical instructors (*3–9*). Many of the qualities frequently cited relate to providing appropriate and usable feedback to students about their clinical performance (Table 1) (*8*). Effective instructors give specific and constructive advice about performance. They are knowledgeable about what students need to know and the criteria for acceptable performance. Furthermore, they are aware of areas where students may experience difficulty and where

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TABLE 1
Qualities of an Effective Clinical Instructor

Quality
Makes high-quality instruction and guidance a priority
Gives specific, constructive evaluations
Observes objectively and consistently
Accessible
Enthusiastic
Encouraging
Good listener
Knowledgeable
Has high expectations for students
Is interested in students and patients
Directs students to additional information

students may frequently commit errors. Their observations are objective and consistent over time and from student to student. Clinical instructors are encouraging when students are having difficulty achieving a certain performance level because they remember their own struggles in achieving competence. Lastly, effective instructors direct students to other professionals, books, and instructional materials as additional sources of information.

EDUCATIONAL SKILLS FOR CLINICAL FACULTY

Three key educational skills for clinical instructors are planning and implementing instruction, objectively analyzing student performance and giving feedback, and facilitating student learning (*10*).

Planning and Implementation

The learning objectives of the clinical experience and criteria for student performance are typically established by the nuclear medicine technology program director or clinical coordinator. Often the objectives indicate the clinical activities in which students need to participate to achieve the objectives. For example, if the objective states that students will be competent in performing total body bone imaging, then students must be assigned to perform bone imaging. Sometimes the clinical instructor may develop an activity that goes beyond the learning objective. If the objective is to process SPECT myocardial perfusion data using a computer, the instructor may select a few cases of varying degrees of difficulty and assign students to process them and compare their results with those of experienced technologists. The instructor may also direct students to process the data with different types of filters to compare the effect on the processed image.

Performance Evaluation

Because clinical instructors are the first-hand observers of student clinical performance, the program director and clinical coordinator rely on clinical instructors to provide accurate and timely information about students' performance. It is important for instructors to note students' strengths as well as weaknesses, and it is essential to identify problems

early in the clinical experience when there is time to help students overcome difficulties (*11,12*). There is nothing more frustrating to a program director or to students than to hear about a lack of performance on the last day of a clinical experience. Student performance needs to be assessed throughout the clinical experience to address any problem areas while there is ample time to intervene. Informal evaluation should be ongoing to provide guidance about behavior that needs to change and how it needs to change. Formal evaluations provide documentation, but ongoing feedback helps develop a student's potential to be a competent practitioner. All evaluation should be directed toward the future because it is not possible to change what has passed, but final evaluations can be meaningful only if there has been frequent dialogue between the instructor and the student about clinical performance.

Instructors may be reluctant to engage in such ongoing discussion because they are uncomfortable giving "bad news" or perceive students to be friends or peers. Clinical instructors perform the same skills and follow the same protocols as the student. This may be one reason why instructors begin to view their students as colleagues. However, the difference between students and true peers is that instructors take control of situations to make changes or take over in difficult situations. Instructors may also find it necessary to discipline students or to counsel them about inappropriate behavior.

It is important to be honest even if it means giving students less than glowing reviews. Students deserve an honest appraisal of their performance with the opportunity to improve. The next 2 sections of this article discuss strategies for giving constructive feedback and for addressing performance that is not meeting standards. Instructors should be mindful that students are not peers but, rather, peers-in-training. As such, it is the instructor's responsibility to set an appropriate tone for the relationship. The instructor has benevolent power over students that needs to be exercised in a positive way (*13*). A line of authority does exist between instructors and students. It may be confusing to students if that line is crossed, particularly if students need discipline or are not meeting performance expectations.

Observational and Feedback Skills

To provide feedback, an instructor needs to know the criteria for acceptable performance, judge how well the performance meets the criteria, and supervise the activity or evaluate its outcome. As mentioned earlier, the performance criteria generally are set by the program director and may be defined on evaluation forms. Making a judgment about student performance requires that the instructor be objective about the performance, ignoring traits or personality issues that are not relevant to the activity being evaluated. Instructors should be aware of the "halo effect" phenomenon, which is evaluating a student highly in all areas because the student performs well in one particular area (*14*). The reverse can also occur, where the student is penalized in every

category because performance in one does not meet expectations. Instructors should also accept the fact that there is often more than one correct way to perform a task. Students should not be penalized because they perform the task correctly but not in the same way as the evaluator might.

Feedback that is constructive supports and encourages learning and motivates students to try again, to do better, or to keep up the good work. Elements that characterize constructive feedback include (*15–17*):

- Describing one's observations: The instructor should present information about the quality of the performance and how well it met established criteria. For instance, a student has just explained a nuclear medicine procedure to a patient in a disorganized fashion using medical jargon that the patient obviously did not understand. Instead of saying "That was the worst procedure explanation I ever heard", the instructor could say "You seemed to have difficulty finding the right words for that patient." The latter comment may open the door to some discussion between the student and the instructor about what information is important to include in a procedure explanation, in what order the information should be presented, and how best to judge a patient's level of understanding. The discussion could then lead to a practice explanation with the instructor posing as the patient.
- Being specific: The instructor should describe the behavior or the outcome of an activity in specific terms. A classic example of nonspecific feedback occurs when a student brings a film to be reviewed by the instructor or the physician. The response may be that "it looks fine" or "it is technically satisfactory", but neither response provides any detail to permit the student to begin evaluating films independently. A better response may be: "This is a technically satisfactory bone image because the patient's bladder was empty, there was no tracer infiltration, and all parts of the skeleton were included in the field of view. And here's what could be better . . . ."
- Focusing on behavior rather than personality traits or the person: Personality traits may be fixed, but behavior can change. The instructor should comment on what the student did, not on what the student is or what the instructor perceives the student to be. Labels such as "stupid", "dummy", and "genius" are inappropriate. Instead, the instructor might point out that the student's action was incorrect or dangerous.
- Addressing the needs of both learner and teacher: Feedback should be delivered to help students change or reinforce behavior. It should never be given to make the instructor feel better or to give some type of psychologic advantage over students. Instructors need to withhold feedback that is hurtful and concentrate on developing ways to supply feedback about negative performance in a way that motivates students. Asking students to evaluate their own performance is a very useful technique that provides the basis for discussion about what needs to change and how the change may be accomplished. If students do not perceive their behavior as needing to change, that fact will surface in their review of their performance. It also provides a convenient opening for instructors who are unsure about how to broach the topic of substandard performance.
- Addressing changeable behaviors: Reminding a student about a shortcoming that cannot be changed or over which the student has no control only increases a student's frustration. For example, an instructor may be concerned that a student with a hand tremor will not be able to perform fine motor skills—for example, intravenous injections. Once the student has demonstrated the ability to perform that skill safely and correctly, the tremor should not be mentioned.
- Being well timed: Feedback should be given at the earliest opportunity after a behavior is demonstrated or an event occurs. Instructors should consider students' readiness to hear feedback, particularly if it is tied to an adverse event. It may be best to wait if a student is emotional. Student-solicited feedback is the optimum type of feedback; however, some students never request feedback from instructors. They assume that "no news is good news." In that case, instructors can request that students assess themselves by asking questions such as: How do you think you're doing? What do you see as your strengths and weaknesses? Another method is to use the evaluation tool provided by the program director and ask students to judge their own performance by completing the form.
- Sharing information rather than advice: The intent of clinical education is to develop a professional who can exercise good judgment and work independently and competently. Giving advice tells learners what to do. To develop independence and clinical judgment skills, students should be encouraged to accept information about their performance and decide for themselves how to act on that information.
- Giving the appropriate amount of information: Overloading students with information may affect students' ability to use all that is offered. Choosing what is most essential is especially important if a student appears to be totally unprepared in a particular area or incompetent in a specific skill. Although it may be satisfying to an instructor to list in detail every part of an activity in which the student is deficient, it is frustrating and of little benefit to the student.
- Being concerned about what or how, not why: Asking "why" frequently puts the one being questioned on the defensive. The student may not be able to explain why and the answer may not even contribute to the student's learning. Probing for supporting evidence or asking for input can be achieved by rephrasing why questions into others such as "What do you think is going on?" or "What led you to that conclusion?"

- Paying attention to the consequences of feedback: The purpose of feedback is to help students learn and develop. Learning involves taking risks so students have to feel supported and safe in taking those risks. It is the instructor's responsibility to provide a balance between support and challenge if students are to take full advantage of the instructor's guidance (*1*). Taking into account that there are multiple types of learning styles, this balance may be different for different students. Self-confidence, risk taking, skill level, and readiness to learn all affect how individuals learn and how much support and challenge each requires (*18,19*). Feedback should cultivate a teacher–student relationship based on trust, concern, and respect, regardless of the student's learning style.

Facilitation Skills

To facilitate means to encourage or assist. Counseling students, answering their questions, and asking questions that prompt students to apply their knowledge are facilitation skills that teachers use to advance their students' learning. In adult education, the teacher is often less of an expert and more of an assistant who helps students consider alternatives and reflect on their own performance (*20*).

Students are most receptive to learning when they ask questions. Instructors sometimes fear that students will ask questions for which they do not know the answers or that they will not have sufficient time to answer all questions students may have. There are several strategies for handling questions (*21*). The instructor can act as an expert and provide the answer. This method saves time but engages the student only minimally. The instructor can also redirect the question back to the student by asking a simple question and working up to more complex ones that eventually lead the student to answer the original question. This is a more labor-intensive and time-consuming method, but it provides a way to review facts or concepts important to the final answer and shows the student how to reach an answer that at first might not have been obvious. It may also demonstrate flaws in the student's logic or gaps in the student's knowledge. Many times in the clinical setting, time and place require that a question be deferred. This is perfectly acceptable, but the instructor must remember to address the question at a more appropriate time. If too many questions remain unanswered, students may become discouraged from asking them or the instructor may lose credibility with students. Instructors should not be reluctant to admit that they do not know the answer to a question. Seeking the answer together is a way to teach locating an appropriate source of information and encourages students to become independent learners. The instructor then serves as a role model for lifelong learning as well.

Creating a learning experience from a seemingly inappropriate or trivial event is called a "teachable moment" (*22,23*). It may be prompted by a student's question or an event from which the instructor can create a learning experience. It provides an opportunity to relate certain concepts, to present the "big picture", or to apply knowledge to an actual event. For instance, a nuclear medicine technology student reports that potassium perchlorate tablets are being sold in a health food store. The advertising states that the tablets protect an individual from radiation exposure in the case of a nuclear attack. Discussion between instructor and student may include how the tablets actually work, how effective they might be in the case of a nuclear attack, and the public's perception about radiation and protection from radiation.

Clinical instructors not only should be content providers but also should facilitate learning rather than merely providing information. Instructors may be most concerned about students receiving the correct information. Correctness is one goal, but reasoning the way to an answer is also important. Effective questioning is a teaching strategy that can help students apply knowledge to solve problems or to gain insight into issues. Solutions to problems that arise in the clinical setting come from the ability to reason. Some questions that may help elicit students' reasoning include: "What do you think is going on?" "What led you to that conclusion?" "How might you handle that situation differently in the future?" Note that these questions are alternate ways to avoid asking "why"—a question that often puts students on the defensive.

CONCLUSION

Formal evaluation at the conclusion of a clinical experience is an endpoint without meaning if there has been little or no meaningful interaction between instructors and students. Frequent, constructive feedback is an essential component in the preparation of professionals who can confidently exercise independent clinical judgment, critique their own clinical performance, and decide on their own professional development needs. Successful clinical instructors use appropriate and timely feedback and facilitation skills to support student learning and foster the professional development of their students.

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