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COMMENTARY

The development and implementation of a performance appraisal framework for radiation therapists in planning and simulation

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Abstract

It is a challenge for radiation therapists (RTs) to keep pace with changing planning technology and techniques while maintaining appropriate skills levels. The ability of individual RTs to meet the demands of this constantly changing practice can only be assured through establishing clearly defined standards for practice and a systematic process for providing feedback on performance. Investigation into existing models for performance appraisal produced minimal results so a radiation therapy-specific framework was developed. The goal for this initiative was to establish a framework that would reflect the complexity of practice and provide a clear measure of performance against them. This paper outlines the implementation of this framework into practice and discusses some lessons learned in the process. The framework was developed and implemented in six stages: (1) project team, (2) scope, (3) dosimetry pilot, (4) staff consultation, (5) finalisation and implementation and (6) future development and evaluation. Both cultural and organisational obstacles needed to be addressed before this framework could be successfully introduced. Even though this slowed progress, addressing these obstacles during the development process was essential to the success of this framework. The incremental approach provided the opportunity for each aspect to be tested and the development of subsequent stages to be informed by lessons learned during the previous one. This approach may be beneficial when developing and implementing projects involving performance appraisal to promote consistency, fairness and quality.

Introduction

It is a challenge for radiation therapists (RTs) to keep pace with changing planning technology and techniques while maintaining appropriate skill levels. At the inception of a new department the challenge of managing the range of professional experience and skill in the new team was identified. The senior team comprised RTs from different departments, representing varied perceptions of standard practice, resulting in inconsistent expectations of junior staff. This raised the need for agreed practice standards and evidence-based skills assessment.

Investigation into existing performance appraisal models produced minimal results. The hospital-based template provided general role expectations but failed to adequately articulate technical and professional practice to support skills assessment. Examples of other competency assessments[1,2] defined entry-level skill requirements but not the range of skills evident in an experienced staff group. Allied health professions have traditionally employed a task-based approach to

competency which carries the risk of 'creating professionals who have isolated skill sets that are not integrated with the knowledge to create complex meaningful performance in the workplace'.[3] McAllister et al.[4] acknowledge the dilemma of defining competency that includes specific skills and the ability to practise in a dynamic environment. The initiative was taken to establish a framework that would reflect the complexity of practice and provide a means to measure performance. It was also anticipated that this would support progression to roles requiring higher levels of skill. Equally important was the promotion of a culture that was fair, consistent, objective, transparent, based on evidence and focused on skills development. Feedback can motivate staff by setting objectives and providing for training and development needs,[5] but it must be based on explicit aims and objectives and be delivered with a real desire to assist learning.[6]

This paper outlines the implementation of this framework into practice and discusses some lessons learned in the process.

Stages of Development and Implementation

The framework was developed and implemented in six stages as illustrated in Figure 1.

Stage 1: Project team

The project team was chosen to represent all levels of skill and experience. Involving more people than less in developing a performance appraisal process provides quality judgement of performance and enhances the perceptions of fairness and the chance of relevant feedback.[7–9] Diversity of experience and perspective within the team proved valuable in developing a process to support the professional development of all staff.

Stage 2: Scope

To avoid adding load to a busy work area, the framework was designed to complement the existing workflow. Planning practice was structured such that each planning RT was responsible for the simulation, dosimetry and plan finalisation for patients allocated to them. Computed tomography (CT) simulation sessions were performed by the planning RT and a dedicated RT (CT RT) rostered to the simulation area. For the purpose of gathering evidence on performance, planning practice was divided into CT simulation, dosimetry and plan finalisation.

Stage 3: Dosimetry pilot

The next stage was to pilot the framework in a defined context to identify any ambiguity and oversights in the developmental process. Dosimetry was chosen because it was a discrete area of practice and supported by a plan evaluation process. The elements contributing to plan quality were identified by the senior RT team as technical complexity, innovation, practical application and compliance with standards of practice. The skills identified as contributing to plan quality were: knowledge of standard practice, appropriate deviation from standard practice, consideration of practical implications for treatment and autonomy. These were drafted into a patient-specific form to be included in the plan evaluation process.

Development of a criterion-referenced assessment

To support consistency and objectivity in plan evaluation, the elements of plan quality were reviewed to determine those open to interpretation. Complexity and innovation were considered most open to subjectivity so to test the understanding of these terms, 12 patient plans were submitted for evaluation. These included a standard 2-field breast technique, radical pelvic and head and neck techniques, and a palliative case including overlap with previous treatment. The plans were de-identified and rated by nine senior RTs with experience in routine plan evaluations. No definitions for complexity or innovation were provided, and participants were asked to rate the plans using the three-tier criterion-referenced system shown in Table 1 and include a justification to identify factors influencing the rating.

For *complexity*, 3 cases were rated consistently and 9 were rated across all 3 levels. For *innovation*, 2 cases were rated consistently and 10 were rated across all 3 levels. Justifications for ratings were collated and although the identified factors were common to all participants, the

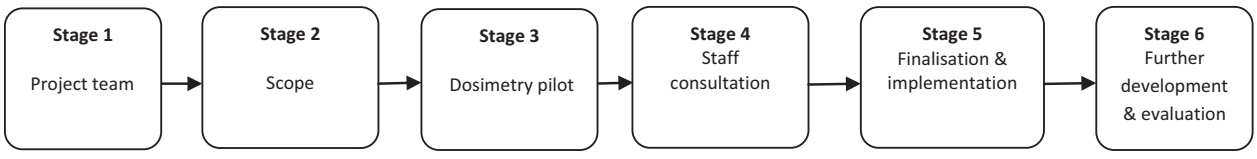

Figure 1. Development and implementation process.

Table 1. Rating guide for complexity and innovation

Technical complexity	A: Low level of complexity
	B: Moderate complexity but without complication
	C: Highly complex: Requires problem solving and high level of skill
Innovation	A: Standard: Requiring no innovation
	B: Moderate level of innovation
	C: High level of innovation required

application to the level of complexity or innovation was inconsistent. The rating for innovation was consistently based on whether the approach was 'common or known' and whether the plan was supported by an existing protocol. Inconsistencies arose as to what was considered 'common or known'. This illustrates a risk of an assumption of knowledge which can influence ratings and lead to unfair expectations of practice.

In consultation with the senior group and established practice standards, a criterion-referenced assessment was developed to support consistency in plan evaluation. For 2 weeks, each plan was then assessed against this criterion-referenced assessment to introduce the dosimetry rating form and the practice of completing it. The patient-specific rating form and criterion-referenced assessment for dosimetry are shown in Tables 2 and 3.

Stage 4: Staff consultation

Before proceeding, the framework outline and the work done to date were presented to the RT group. Response indicated both support for the initiative and concerns that the process may not be fair. Additional concerns were: lack of support for the CT RT role, lack of ready access to protocols and procedures, inconsistent advice from senior RTs and how confidentiality of feedback would be assured. These issues identified barriers to the success of the framework so further development was put on hold until they were addressed.

A role description and an orientation process for the CT RT role were developed to support transition to and consistency in this role.

Concerns regarding the availability of protocols and the communication of practice changes were responded to by initiating a review and update of protocols, improving access to them and providing a means for communicating any inconsistencies in practice and advice. These inconsistencies were discussed in the senior group, and once a consensus was reached, the decisions were documented as standard practice.

To support confidentiality, it was decided that the detailed feedback would remain the property of the recipient. The feedback conversation included devising a plan to address development needs or requests with the agreement that managers or clinical educators would be consulted to gain the support needed. An agreed summary of the feedback and development goals was then recorded in the mandatory performance appraisal document and filed with management. Over time the process was refined so that a senior was nominated to coordinate each cycle of feedback for the RT. Even though changed circumstance, staffing or personal preference could require flexibility in this, it was believed that consistency in the coordination of the feedback would allow trust to develop and for continuity of information and accountability for learning needs to be ensured.

Table 2. Patient-specific rating form – dosimetry

Pt UR	Planning RT	Evaluation RT	Technique
Plan elements	Rating		
Technical complexity	A: Low level of complexity		
	B: Moderate level of complexity but without complication		
	C: Highly complex requiring problem solving and high level of skill		
Level of innovation	A: Standard and required no innovation		
	B: Moderate level of innovation		
	C: High level of innovation required		
Practical application	A: Not practical or applicable: Alternative needs to be sought		
	B: Practical and applicable: Requires careful technical communication		
	C: Practical and applicable		
Compliance with protocols/standards of practice	A: Does not comply and needs to be replanned		
	B: Mostly complies: Requires some alteration		
	C: Complies or variations can be justified		
Autonomy	A: Required high level of input and direction		
	B: Required some input and direction		
	C: Plan was performed autonomously		

Stage 5: Finalisation and implementation

After addressing staff concerns, skill sets were defined for the remaining areas of planning practice. CT simulation practice was assessed by the CT RT in terms of CT simulation practice and technique, patient positioning, communication and stabilisation and positioning (Table 4). Plan finalisation was assessed in terms of treatment plan presentation and data transfer to the treatment record and was evaluated at the final RT check.

A final feedback form was drafted to summarise the dosimetry, CT simulation and plan finalisation forms and include professional attitude, time/workload management, technical communication and commitment to quality. These were assessed through observation by the senior RTs.

Table 3. Criterion-reference assessment for dosimetry

Innovation: 'The introduction of a new idea, method, or device: having the skill to know and understand the appropriateness of introducing something new'.	
A	Based on a supporting protocol (written or established)
B	Requires some variation from the accepted standard/technique
C	No supporting protocol Resulting dose distribution justifies the innovation used
Complexity: 'Complicated or having many aspects'	
A	Supporting protocol available (written or established) Standard approach to dosimetry Clear choice in technique Routine bolus application Easily accessible tumour volume
B	Judgement required in choice of technique Requires variation from protocols/template due to complicating factors: • Geometry of PTV and proximity to critical structures • Complexity due to inhomogeneity • Consideration of previous treatment and overlap doses • Unusual anatomy Considerations of reproducibility (e.g. junctioning fields) Requires problem solving Complexity in bolus thickness, placement and shape Image registration with incompatible patient positioning adds complexity
C	High volume of work involved No supporting protocol Complicating aspects to plan High-level problem solving
Autonomy:	
A: High level of input and direction	Input regarding concept of plan Input regarding choice of technique Input resulting in a replan Repeated input from categories C and B (from autonomy)
B: Some input and direction	Solutions for added degrees of complexity Significant problem solving beyond basic plan concept Repeated reminders on housekeeping Repetitive assistance from category C High volume from category C Adjustments which significantly affect plan optimisation
C: Performed autonomously	Slight adjustments which may *further* optimise the plan. For example, minor adjustments to field angles or shielding Final presentation of plan meets standards of practice Offering an opinion on options devised by the planner Negotiation on specific RO's preference on dosimetry Advice on changes to standards of practice unknown to the planner

The entire process was then trialled with a planning RT and a coordinating senior RT and at the completion of this trial, refinements were suggested. It was identified that the three-tiered rating did not apply to all performance indicators and a two-tier rating was included (Tables 4 and 5). Completing forms at the end of each CT session was found to hinder workflow, so it was decided that these would be completed after a block of simulations. Provision was also made in the dosimetry rating form for the RT to document any justifications for technical choices that may influence the rating.

Application of the tool

A senior RT was nominated to co-ordinate the process and only two RTs underwent the process at any one time, acknowledging the additional demand on senior staff. Those undergoing the process were rostered in planning for 2 weeks before their 4-week review period commenced. Feedback was collated and delivered shortly afterwards. This allowed for reorientation to practice, opportunity to demonstrate range of skill and opportunity to respond to feedback before being rostered out of the area. Timely

Table 4. CT evaluation form

Pt. UR	Technique	RT	CT RT			
CT/simulator technique						
Demonstrates understanding of departmental protocols and practice standards			A	B	C	NA
Demonstrates appropriate approach for proposed technique			A	B	C	NA
Assesses patient condition in light of proposed technique			A	B	C	NA
Reliable in performing standard CT/simulator procedures			A	B	C	NA
Reliable in performing non-standard/complex CT/simulator procedures			A	B	C	NA
Demonstrates efficient and effective workload management			A	B	C	NA
Patient positioning						
Considers all factors affecting the choice of technique			A	B	C	NA
Considers implications for planning and treatment and chooses accordingly			A	B	C	NA
Position appropriate for patient condition			A	B	C	NA
Demonstrates problem solving			A	B	C	NA
Rating guide						
A: Developing. Requires guidance at all levels			C: Self-directed and innovative			
B: Self-directed for standard situations. Requires guidance for complex situations			NA: Not attempted			
Communication						
RT → Patient:						
• Efficient: Considers time frames and work processes			D		C	NA
• Effective: Sensitive to patient's needs at all times						
• Provides appropriate and accurate information						
RT → CT RT:						
• Collaborates on technical approach			D		C	NA
• Communicates roles and tasks						
• Seeks direction when required						
RT → RO:						
• Discusses patient-specific considerations			D		C	NA
• Discusses feasibility and practicality of proposed technique						
• Provides advice to RO regarding limitations of a technique						
Wax/mouthpiece making						
• Meets requirements of prescription			D		C	NA
• Accuracy in contact and positioning						
• Practical and effective. Appropriate to condition of patient						
Stabilisation and immobilisation devices						
• Application of equipment meets departmental guidelines			D		C	NA
• Determines optimal solutions to challenging situations						
• Alterations: Considers impact on treatment accuracy						
Rating guide						
D: Developing. Requires input and guidance			C. Self-directed			

delivery of feedback ensures that any issues raised are current and that opportunity is given for development. Frequent feedback is recommended,[10–12] however the frequency was determined by rostering and being able to give opportunity for other RTs to participate.

The RT receiving feedback contributed to the feedback by completing a self-evaluation and at the end of the period, the feedback forms were collated in consultation with the senior team in planning. The collated feedback provided an overview of the RT's performance, how self-perception aligned with the perception of the team and whether the allocated case mix had provided adequate opportunity for demonstration of skill. In this way, feedback was given to both the planner and the senior staff. It was also important to allow the RT to contribute additional information that may add context to the feedback given. Allowing feedback to be a 'conversation about performance' rather than a 'one way transmission of information' can contribute to the perception of justice.[6]

Table 5. Final feedback (excluding dosimetry and CT)

Time/workload management				
Meets deadlines consistently		D	C	NA
Demonstrates responsibility for workload:		D	C	NA
i Timely requests for assistance				
ii Appropriate hand over of work when planning absences				
Demonstrates effective management of broad case mix whilst maintaining appropriate case load		D	C	NA
Technical communication to ensure continuity of information				
Sound written communication		D	C	NA
• Simulator/CT sheet				
• Evaluation sheet				
• Treatment sheet				
• Treatment plan				
Sound interpersonal communication		D	C	NA
• Within RT planning team				
• Planning → Treatment				
• Within multidisciplinary team				
Demonstrates ability to negotiate with RO regarding dose distribution and constraints		D	C	NA
Finalisation and presentation of work				
Finalised work reflects standards for documentation		D	C	NA
Documentation of work is clear and legible		D	C	NA
Quality assurance				
Identifies evidence-based quality improvement		D	C	NA
Rating guide				
D: Developing. Requires input and guidance	C. Self-directed			
Professional attitude				
Self-directed and self-motivated	A	B	C	NA
Demonstrates consistency of practice	A	B	C	NA
Undertakes regular self-evaluation of own practice and is aware of development needs	A	B	C	NA
Seeks and considers feedback from colleagues regarding own practice	A	B	C	NA
Takes responsibility for and is committed to own development	A	B	C	NA
Contributes to the professional development of others	A	B	C	NA
Rating guide				
A: Developing. Requires guidance at all levels	C: Self-directed and innovative			
B: Self-directed for standard situations. Requires guidance for complex situations	NA: Not attempted			

Stage 6: Further development and evaluation

Further development of the framework included supervisory roles, such as the CT RT. These incorporated 360° feedback which provides insight into the perceptions of impact on the team. These perceptions determine the success of an individual in their role.[13] Following the implementation, a study was conducted to evaluate the effectiveness of the framework as experienced by RTs, the results of which are the subject of a previous paper.[14]

Obstacles to implementation

Cultural and organisational obstacles were encountered during the introduction of this framework. Mistrust among staff was based on experience and concerns were expressed that the process would not be fair. The importance of a performance appraisal system may be denied if fairness and trust are not perceived in the process.[7] Fairness and objectivity in a performance appraisal process are promoted through sharing control of the process, involving multiple contributors, open knowledge of the process and trust that supervisors are free of bias.[15]

The work was initially based on the assumption of commonly understood practice standards and protocols. Staff identified the lack of accessible and current documentation to support consistent practice, and the dosimetry pilot emphasised the need to normalise expectations of senior staff. The issues surrounding defined practice standards are significant because the lack of a defined standard makes performance appraisal unreliable.

Even though progress was slowed, addressing these obstacles was essential to the success of this framework.

Conclusion

The ability of individual RTs to meet the demands of constantly changing practice can only be assured through establishing clearly defined standards for practice and a systematic process for providing feedback on performance. The framework was introduced to define standards of practice and assess the performance of RTs against them. The goal was to provide feedback on performance that was evidence based, objective and fair. The incremental approach allowed the opportunity for each aspect to be tested and the development of subsequent stages to be informed by lessons learned during the previous one. This approach may be beneficial when developing and implementing projects involving performance appraisal and feedback to promote consistency, fairness and quality.

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Conflict of Interest

The authors declare no conflict of interest.

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