Understanding the Integral Role of Technologists in Human-Centered Radiology
A Design Thinking Approach

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Team

UC Health
- CT Manager
- MRI Manager
- CT Technologists
- MRI Technologists
- Quality Coordinator
- Business Manager
- Radiologists
- Department Chair

Design Team
- Live Well Collaborative
  - Assoc. Dean of College of Design, Architecture, Art, and Planning
  - PhD Architecture
  - Masters of Design
  - Industrial Design
  - Graphic Communication Design
  - Fashion Design
- General Electric Healthcare Global Design
Purpose

It is important to move beyond patient-centered to human-centered radiology where empathy towards all users is essential. Our purpose was to apply a design thinking approach to understand the daily workflow and challenges of outpatient CT and MRI technologists.
What is Design Thinking?

A creative, human-centered problem solving approach that leverages empathy, collective idea generation, rapid prototyping, and continuous testing to tackle complex challenges.

<table>
<thead>
<tr>
<th>FRAME A QUESTION</th>
<th>GATHER INSPIRATION</th>
<th>GENERATE IDEAS</th>
<th>MAKE IDEAS TANGIBLE</th>
<th>TEST TO LEARN</th>
<th>SHARE THE STORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify a driving question that inspires others to search for creative solutions.</td>
<td>Inspire new thinking by discovering what people really need.</td>
<td>Push past obvious solutions to get to breakthrough ideas.</td>
<td>Build rough prototypes to learn how to make ideas better.</td>
<td>Refine ideas by gathering feedback and experimenting forward.</td>
<td>Craft a human story to inspire others toward action.</td>
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“We ask what can we do to change things? That question leads us to design which is the act of changing existing situations into preferred ones.”

- Herb Simon, Nobel Prize in Economics 1978
Methodology

<table>
<thead>
<tr>
<th>Interviews</th>
<th>Observations</th>
</tr>
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<tbody>
<tr>
<td>MR Technologists</td>
<td>1 Main MRI + 1 3T MRI + 1 MAB MRI</td>
</tr>
<tr>
<td>CT Technologists</td>
<td>3 ER CT+ 2 Main CT + 2 MAB CT</td>
</tr>
</tbody>
</table>
MR Technologist Workflow

PRE-PATIENT PREPARATION
- Arrive
- Clock in
- Check Schedule
- Check Equipment

PATIENT INTERACTION
1. Call from Front Desk
   - Pick up Patient
   - Verify Patient Information
   - Brief Introduction
   - Guide Patient to Changing Room
   - Go through Paper Work
2. Patient Get Changed
   - Escort Patient to Scan Room
   - Position Patient
   - Give Patient Instructions
   - Prepare Scanner/Protocol
   - Start Scanning
3. Give Patient Instructions and Updates
4. Send Images to Radiologist
   - End Scan
   - Help Patient out of Scanner
   - Escort Patient to Changing Room
   - Show Patient the Way out

UNEXPECTED TASK
1. Technologists sometimes may have to spend time looking for patient who inadvertently arrived at the incorrect location for their appointment.
2. Conversation containing patient information might be heard by another patient who is in the changing room.
3. During the imaging procedure, patients are unable to supervise children who may have accompanied them to the hospital. Technologists would be then asked to take care of the children.
4. There are cases that may require the Technologist to speak with a Radiologist:
   - changes in the study initially ordered
   - patient can’t tolerate the procedure ordered by the referring physician
Additional Insights

Phone Interruption

The phone calls require technologists to pause their work and turn their attention to another profile or computer to check detailed information.

Technologist Task Re-distribution

Unnecessary Pauses

In some cases, the scanning operation doesn't allow for pauses in the process. Any stops require the process to restart from the beginning.

Patient Education
CT Technologist Workflow

PRE-PATIENT PREPARATION
- Arrive
- Clock in
- Check Schedule
- Check Equipment

PATIENT INTERACTION
1. Call from Front Desk
2. Pick up Patient
   - Interpreter
   - Verify Patient Information
     - Brief Introduction
   - Lead Patient to Preparation Room
     - Prepare Oral Contrast
     - Call Control Room
   - Escort Patient to Scan Room
   - Position Patient
   - Give Patient Instructions
   - Prepare Scanner/Protocol
   - Start Scanning
   - Give Patient Instructions and Updates
   - Send Images to Radiologist
   - End Scan
   - Help Patient out of Scanner
   - Show Patient the Way out

UNEXPECTED TASK
1. Patients may not arrive at the scheduled time resulting in the need to reassess the rest of the schedule for the day.
2. Patient may be added to the current full schedule or to a no-show/open slot.
3. Patient was not informed of the need to access a power port until they arrived to the scan room.
4. Protocol information from Epic may be unclear and forces the Technologist to call a Radiologist for confirmation or adjustments. Changes made at this time may not be approved by insurance.
## Summary of Pain Points

<table>
<thead>
<tr>
<th>COMMUNICATION</th>
<th>VARYING PATIENT NEEDS</th>
<th>SET BACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Incorrect ordering of exam</td>
<td>• Variable mobility/ social support</td>
<td>• Patients arrive in wrong location</td>
</tr>
<tr>
<td>• Inability to access records</td>
<td>• Tech must tend to family</td>
<td>• Nurses too busy to prep</td>
</tr>
<tr>
<td>• Patient misinformed</td>
<td>• Tech must guide in/out</td>
<td>• Patients arrive all at once</td>
</tr>
<tr>
<td>• History prohibits scanning</td>
<td>• ESL patients</td>
<td>• Patients are not prepared</td>
</tr>
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Opportunity Areas

ENVIRONMENT
- exam room
- waiting room

COMMUNICATION
- changing case state
- language tools
- patient assistance

CASE SPECIFIC ADAPTATIONS
- urgency of case
- medical history
- ordering physician

PATIENT EDUCATION
- procedure expectation
- care team
- wayfinding
Conclusion

- Technologists play a vital role in each patient’s journey as they navigate through the hospital and radiology department.

- Mapping and understanding the expected and unexpected tasks of technologists is critical in addressing challenges and optimizing the patient and staff experience.