Human Resources, Education and Training, and Qualifications

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**Overview**
Health care information technology (IT) has evolved rapidly and inexorably in the past 20 years. For example, physicians from the baby boomer generation have witnessed and taken part in health-care management and education that are radically different from when they started in the profession. Fundamentally, the dissemination of the digital computer is at the core of these changes; it has facilitated the development of a new set of diagnostic tools, which the medical community adopted over a relatively short period of time. IT has also spawned a new set of health-care data aggregation and communication methods. Although most will agree that such technology has revolutionized the practice of medicine, it has also fostered a data revolution that is simultaneously useful and disruptive. Individual patient data routinely available to the modern practitioner are voluminous, and the effective use and implementation of the right IT tools is one potential solution to manage health data overload.

Diagnostic imaging has been both an innovator and benefactor of IT advances. For example, IT has made the filmless and paperless radiology department a reality. In addition, IT innovations facilitate complex imaging workflow loops innate to the modern radiology facility. Such loops impact every aspect of radiology functions, including decision support, order entry, scheduling, patient and protocol management, image review and display, postprocessing, reporting, billing, communications, and critical results reporting. Each component of these functions involves both traditional and specialized interfaces between radiologists, technologists, schedulers, managers, administrators, referring health-care providers, and patients. Management of the vast number of resulting interactions is critical to the success of a modern radiology department. As a result, administration and management should place a high value on their IT solutions and the staff supporting those resources.

Unfortunately, despite radiology’s tremendous dependence on its tools, IT remains undervalued in far too many radiology departments and is not perceived as a strategic partner in the success of the organization. As departments face declining revenues and increased workload, less focus is placed on expanding IT infrastructure to meet strategic goals. In reality, one cannot overestimate the value of an effective IT group in the success of daily operational goals and in meeting many of the cost containment and regulatory changes facing radiology.

IT is generally perceived as a generic or one-size-fits-all support service that is interchangeable throughout an organization; the individual that replaces the desktop PC
in the emergency department may be assumed to have a sufficient skillset to plan network topography for a PACS deployment. The reality is that IT has become subspecialized. The traditional IT support model in many groups is to staff the radiology department with individuals whose skillsets are limited to maintaining the existing equipment. Frequently, these individuals have no specific expertise in imaging informatics or clinical radiology. Additionally, there may be little recognition for the vast differences between an individual with general IT support skills versus one who has evolved into an imaging informatics professional (IIP). Mission-critical decisions such as purchasing, deployment, training, and even implementation may end up delegated to individuals with insufficient experience and training. Moreover, in some settings critical IT decisions are often made at the administrative level and not necessarily by the individuals who depend on the hardware/software nor by the individuals with expertise to critically evaluate such highly specialized technology. In addition, because diagnostic imaging is often a hospital-based or ancillary service, the support of diagnostic imaging is often relegated to peripheral IT managers who are otherwise tied directly into laboratory or pathology services.

Because diagnostic radiology is so tightly linked to and dependent on its information systems, diagnostic radiologists are unable to deliver safe and high-quality service without a fluid and effective IT infrastructure. Those who function within radiology IT have a very unique outlook and perspective distinctive from their nonimaging IT peers; they view themselves as health-care professionals first, with specialty training in IT. It is this fundamental difference in the Philosophical approach to their role that differentiates the IIP from a general IT employee. Paramount to creating this type of specialized infrastructure is the recruitment of requisite leadership to build the IT division and exploit IT to its full capacity to augment the clinical mission of a successful imaging enterprise.

This article is designed to serve as a guide for you, the practicing radiologist, to build an effective IT division by considering leadership, management, and human resources. We address the process for building an IT team from the ground up and also provide recommendations for modifying and improving the effectiveness of an existing IT group. Critical to this discussion is the concept of the IIP and the differential advantage that such training brings to your department. We will also focus on the critical role of the radiologist IT liaison in bridging gaps among organizations’ IT, medical, and administrative functions.

Value/Role of the Physician Informaticist

Although imaging-based information systems are ever-expanding, the role of informatics is still not well understood. Most generally, informatics can be defined as the science of information flow in a decision-making process. In most industries, this process is embodied in well-defined management processes handled by information systems management personnel. However, in medicine, the workflow and information needs of personnel with clinical knowledge are often not well understood by nonclinical IT staff. This can lead to misalignment of clinical needs and the information tools provided by IT departments.

Too often the term informatics is used interchangeably with IT, which is similar to mistaking an architect for a contractor. Just as an architect designs a building to optimally meet the needs of its inhabitants, an informaticist designs the information flow to meet the needs of personnel with clinical knowledge. A physician who is cross-trained in informatics has
a unique skillset that can bridge the gap between clinical needs and IT resources. Many organizations fail to recognize the many benefits of having a clinical information “architect” in their leadership arsenal and at the same time underestimate the risks of not addressing the responsibilities of this role. Department chairs and private practice group leaders would do well to consider the following ways in which physician informatics expertise and leadership can help them meet their objectives.

**Informatics Drives Quality**

According to an article in the *Journal of the American College of Radiology*, “Quality is the extent to which the right procedure is done in the right way at the right time, and the correct interpretation is accurately and quickly communicated to the patient and referring physician” [1]. As quality increasingly becomes a critical issue for radiology, informatics will play an increasingly important role in implementation of a successful strategy. Informatics tools can be used at each step, from ordering and scheduling to exam acquisition and interpretation to report generation and delivery. The ability to measure, monitor, and improve quality at each step of the workflow is essential not only to operate efficiently and effectively, but also to comply with increasing regulatory requirements and combat the threat of commoditization of radiology services [2]. The field of informatics puts the enabling technologies at the center of quality efforts.

Although a variety of IT systems can be purchased and installed to perform a vast array of functions, informatics leaders can provide the clinical context and guidance necessary to change processes and behaviors to improve performance. Moreover, if IT systems are implemented without informatics input and guidance, they may actually become a liability should they fail to align with the needs of the clinicians and may be subsequently subverted and/or abandoned.

**Informatics Drives Decisions**

Medical imaging generates massive amounts of data, which are often locked in proprietary data silos (PACS, RIS, EMR). The size, complexity, and distributed nature of the data can make it impossible to see the big picture, which in turn hampers strategic decision making. Recent developments in the areas of business intelligence/analytics and dashboards are attempting to remedy this problem by normalizing and centralizing data for easier analysis.

However, although technical staff know how to access the data, they often do not know clinicians’ and administrators’ questions. Conversely, administrators and clinicians do not know what data are available to query or what questions may be possible or impossible to answer. In addition, they may not have the analytics training to form the question in a translatable database query. In many circumstances, when they do articulate a question, it is of limited scope, takes a long time for the technical team to answer, and may have omitted an essential element. Such a process often feels as if it is more problematic than beneficial. In that case, clinicians and administrators may disengage from the process of data discovery and thereby lose a valuable opportunity to improve clinical and operational decisions.
A clinical informaticist can bridge this divide because they can 1) understand the clinical context or scientific opportunity; 2) understand the underlying data potential; and 3) articulate hypotheses to the technical team and help troubleshooting possible problems.

**Informatics Drives Efficiency**

Efficiency is the ability to accomplish a job with minimum time and effort. Informatics techniques can help increase efficiency by tracing the flow of information through an organization and highlighting any redundancies and inefficiencies. A physician informaticist can see the whole workflow within the clinical mission context. He/she can identify ways to minimize radiologists’ and technologists’ work efforts by, for example, minimizing unnecessary steps or the number of disparate systems, removing humans as integrating agents, integrating workflows, and eliminating paper as the transport vehicle for information. Focusing on workflow can boost efficiency by minimizing the number of steps, minimizing waste, and reducing the chance of error (i.e., doing more with less). This may become a more familiar refrain as payment models shift from fee-for-service to capitated payments.

**Responsibilities of the Physician Informaticist**

The physician informaticist may have many different roles and responsibilities depending on the size and scope of the imaging operation or practice. It is important to recognize that as institutions of all sizes deploy EMRs, physicians with expertise in imaging such as radiologists need to fill the role of the radiology physician informaticist. This is because the needs of the radiology department are typically very different than those of other institutional departments. There are several important characteristics and activities required of the physician informaticist, including his/her ability to be a visionary, innovator, bridge, facilitator, and informatics evangelist.

**Visionary**

The physician informaticist sits at the nexus of two knowledge domains (clinical and informatics) — a unique and powerful viewpoint. In this position, he/she can take a much broader look at the clinical workflow, anticipate needs, and apply effective informatics techniques to maximally leverage IT resources and set the information strategy. This individual can step out of the daily grind to make sure the team is headed in the right direction and can take the time to “sharpen the saw” [3].

**Innovator**

Clinical domain expertise paired with informatics skills is a powerful combination to drive innovation. It has been shown repeatedly that innovation occurs at the margins of systems and at the overlap of distinct disciplines. The physician who can think both in terms of the clinical need as well as informatics concepts will be able to make connections that are not seen by either side alone. Maximizing workflow efficiency, providing just-in-time decision support, and providing effective business analytics are areas where physician informaticists will play the role of innovators to connect needs to solutions.
Bridge

The physician informatics champion can serve as a communication bridge between the clinical and IT staff. It is no secret that these two groups do not speak the same “language” and are often at odds. With a foot in both worlds, the physician informaticist can translate the needs of the clinical service into requirements more easily understood by the technical group and vice versa.

It is also important for the informatics leader to consider the way in which radiology informatics fits into a larger organizational construct and to bridge potential gaps. In private practice, where the imaging group may manage all staff and infrastructure, this is not likely an issue. However, in large academic centers it can become a challenge, and each center may have a different philosophy in this regard. There are several instances in which the physician informaticist plays a key role in strategic planning:

In an increasing number of hospital infrastructures, dedicated PACS networks are unnecessary. Thick-client workstations (i.e., dedicated applications physically loaded and operating on each client workstation) are facing obsolescence. Virtualization of mass storage is replacing more costly dedicated image storage systems. Some might argue that imaging IT is mature enough to be merged with enterprise IT. In this centralized model, radiology-centric expertise may guide and direct the operations, but the resources are part of the enterprise IT structure. In this environment, the inertia of the centralized model must be balanced with the preservation of domain expertise, since this is where the true innovation happens. Achieving this balance is the role of the physician informaticist.

As another example, in some radiology practices it still may be necessary and/or preferable for radiology to maintain its own storage and infrastructure. However, this construct can create challenges when relating back to the enterprise IT, and some friction between departments may occur when there are competing priorities. The physician informaticist can mitigate these challenges by serving on any available cross-discipline IT committees and by promoting frequent communication. Ideally, the radiology IT group would also invite participation from enterprise IT in its coordination meetings. In this scenario, the radiology physician informaticist should strive for a good working relationship with the chief information officer and chief medical information officer.

Facilitator

The physician informaticist may also facilitate information sharing across the group. As someone identified as the go-to person for informatics, the informaticist will naturally become the organization's knowledge hub. As radiologists and technologists in the trenches encounter new needs or discover existing systems' shortcomings in the course of daily operations, they will have someone who can capture and inventory ideas and place them into the context of the overall informatics strategy.
Evangelist

Another important role of the physician informaticist is to be a visible group presence, which should include a position on any practice/faculty leadership committees. An informatics evangelist works to promote the principles of informatics in the department at every potential opportunity. This may be in the form of short, ad hoc “elevator pitches” as well as prepared formal presentations. This may occur with clinical staff at leadership and general faculty meetings as well as with IT staff at technical meetings. The physician informaticist helps both clinical and technical personnel understand that good informatics is a discipline, not just a set of tools. The evangelist approach to this role follows the advice of Thomas Edison: “There’s a better way to do it—find it.”

Organizational Relationships

To ensure the long-range success and satisfaction of both the informaticist and the organization, it is critical that the position of the physician informaticist be structured appropriately. This foundational work includes assignments such as job title, reporting, budget, direct reports, and other resources. Before creating this position, an organization should consider each of these elements.

Various titles have been used depending on the expertise and seniority of the informatics leader, including director of imaging informatics, chief of imaging informatics, or vice chair of imaging informatics. Organizations less familiar with informatics may choose to start at the director level, but should plan to grow the position to a vice chair level once a successful program is established. This higher-level position leverages leadership across departments and reflects the individual’s experience. This pattern of growth has occurred at several leading academic centers with apparent success.

There are various reporting structures for a physician informaticist champion. In a small group private practice, the physician informaticist reports directly to the group leadership. In academic departments, there may be multiple approaches; the most straightforward model is for the physician informaticist to report to the radiology department chair. In more mature informatics environments in which enterprise imaging plays a large role, he/she may also directly report to the chief information officer or the chief medical information officer.

Because this position may be new for many organizations, it is critical that the reporting channels are clearly established and that the position has the support of executive-level leadership. Without careful planning and buy-in from key positions, the informatics leader may find himself/herself marginalized in the organization. Avoid creating a position that gives responsibility without real authority. An organization that identifies informaticists as leaders but does not give actual decision-making authority may reveal an ideological problem held by its leaders regarding the role of informatics expertise. Such a problem occurs when, for example, an informaticist is perceived as an internal consultant. In this scenario, the informaticist develops plans and strategies but does not have a direct path to execute them. Informaticists should be wary about organizations that believe informatics physicians do not need, or should not have, direct reports. This may reveal the true informatics beliefs of the organization’s leaders. Without direct control of resources (i.e., hiring/firing and budgets), this role becomes an internal consultant, not truly a leader,
despite any titles or representations to the contrary. This reduces the effectiveness of translation of informatics expertise into reality and certainly reduces job satisfaction [4].

In the situation where the physician informatics leader has no direct control of IT resources, the job becomes much more difficult. He/she must work much harder to obtain indirect influence. In this setting, building strong relationships with the IT and financial directors who control resources will be crucial if this person is to have any measurable success.

**Expected Time Requirements**

Time commitments vary with organization complexity. In some large academic centers, the physician informaticist may be full time in informatics and paid by enterprise IT. In small- to medium-sized operations, the informaticist may have 1–2 days per week of informatics time, and the remaining time is spent in clinical radiology. The ideal time commitment approach may be one that balances clinical and informatics duties. This allows the informaticist to continue with his/her clinical skills and adds the advantage of first-hand, up-to-date knowledge of what clinicians face. Balancing both disciplines is a challenge that comes with the territory.

**Qualifications**

Given that this area of informatics leadership in radiology is in the early stages of development, there are no set qualifications for physician informaticist candidates. In most cases, successful candidates for this position would be board certified in radiology with proven managerial and imaging technology experience. The specific managerial and technology experience will likely vary widely among candidates. The most likely candidates are those individuals naturally interested in technology, quality improvement, and process efficiency and have demonstrated actions to improve the systems in which they have worked. Some candidates will have shown early leadership potential while serving as chief residents. The younger generation of radiologists have been immersed in technology throughout their lives, and to this group, effective use of technology has more likely become second nature. For many groups, finding a radiologist who is interested in this role will be the first step. Then, the informatics education may be gained on the job and through training options outlined in the following section. Perhaps more important than formal education is a strong drive to learn, an inclination to solve tough problems, and a “let’s get it done” attitude.

**Education and Training**

Unlike clinical training, there is no formal defined pathway for informatics education for the MD/DO. This poses a challenge for the physician informaticist who wants to build knowledge and skills in this area. Despite the ambiguity regarding a required or reasonable level of domain training, various avenues are available to pursue informatics education, including fellowships, formal education options, and resources from associations and organizations dedicated to informatics.
Accredited Training Fellowships

The American Board of Medical Specialties (ABMS) approved a new accredited subspecialty in clinical informatics. This new certification is jointly sponsored by the American Board of Preventive Medicine and the American Board of Pathology and is managed by the American Medical Informatics Association (AMIA). The curriculum and examination encompasses all areas of clinical informatics and does not have a specific focus on imaging informatics. The first certification exam is scheduled for fall 2013. Practicing informatics professionals who demonstrate experience in the field will be grandfathered into the subspecialty after passing the certifying exam. After five years, new applicants will need to complete a fellowship at an accredited program and pass the certifying exam. More information is available at www.theabpm.org.

Nonaccredited Training Fellowships

According to the Society for Imaging Informatics in Medicine (SIIM), several institutions sponsor specific fellowships in imaging informatics, which are usually combined with clinical fellowships at the end of residency training:

- Brigham & Women's Hospital
- Massachusetts General Hospital
- Mayo Clinic
- Medical College of Wisconsin
- University of Maryland and VA Maryland Healthcare System
- University of Pennsylvania
- University of Pittsburgh
- University of Utah

Postgraduate Degrees

For those interested in a formal informatics education, many universities have graduate programs in biomedical informatics. Some of these may even offer degrees based on distance learning (usually nonthesis tracts). For a list of programs funded by the National Library of Medicine, visit www.nlm.nih.gov/ep/GrantTrainInstitute.html.

Certified Imaging Informatics Professional

SIIM has established a program for the certification of imaging informatics professionals (CIIP). Certification is sponsored by the American Board of Imaging Informatics. Although CIIP is targeted mainly at PACS administrators and other department IT support staff, radiologists are also welcome to participate and will gain valuable knowledge about the tools of the trade.

Professional Association Educational Resources

Several professional societies connected to informatics hold annual conferences that provide education for attendees. SIIM is the organization most focused on informatics topics specific to imaging. There are generally 7–8 learning tracks centered on current challenges in imaging informatics. Conference material ranges from introductory to advanced, and
conferences offer great networking opportunities for emerging leaders. Another good source of training can be found at the annual meeting of the Radiological Society of North America (RSNA). RSNA provides a specific informatics learning track with refresher courses, as well as scientific sessions addressing current topics. For a broader informatics view, the AMIA goes beyond imaging informatics and covers informatics topics relating to all of medicine. The Healthcare Information and Management Systems Society hosts one of the largest conferences focused on general IT in health care; it is perhaps the most vendor-focused and often receives the most press.

Starting with an effective radiology IT leadership team is paramount to enhancing the role of IT in your department. Recruiting a physician champion to work in concert with the IT team is one model for success, but it is not the only model. In the absence of a physician IT leader, the role of IT champion and liaison may fall upon the nonphysician IT lead in your department. Selecting the appropriate IT manager becomes more challenging because of the multiple roles this individual must serve: interfacing with physicians, administration, and ancillary staff as well as leading the IT team. Ostensibly the nonphysician IT manager must be aware and empathetic to the needs of all expert personnel in a department who interact with IT systems. Moreover, he/she must also be motivated to constantly explore better methods to improve interaction with current and future IT solutions. The IT manager can have the most influence as a change agent by building or transforming a new or existing radiology IT team.

Building an Imaging Informatics Professional Team

Organizations may sometimes rely on nonphysician leaders to guide their clinical IT needs. This can only be successful when a nonphysician leader partners closely with clinical stakeholders. The role of a clinical informaticist is to bridge and translate the cultural communication barriers and specific needs between the clinical and technology worlds. If your organization relies on nonphysician informaticists or other personnel without a clinical background, it becomes extremely important to identify candidates with strong service and communication skills who understand that their mission goes beyond keeping the department’s computers running.

Selecting the right candidate to lead your IT efforts in general requires thoughtful introspection into the particular needs and culture of your organization. Successful IT leaders should not focus their energies solely on technology. Often the success of any technology initiative (and ultimately the measure of the IT leadership team) relies on additional factors such as organizational readiness, communication, and a leader’s ability to execute on a vision. IT should be considered a strategic asset to your organization, and the successful IT leader should have a broad view of the critical role that he/she plays in your organization’s success.

Picking an Operational IT Leader

Although too narrow a focus on technology can be a problem, a strong foundation in IT fundamentals is essential for successful informatics leadership. IT leaders need to understand technology and the health IT ecosystem, including how data flows through various information systems and how any potential disruption (such as upgrades or downtimes) may impact operations. Ideally, candidates should have an interest in
technology that is not merely professional. This background is not only important to understand and expeditiously adjust to current trends but also essential to establishing credibility in the larger hospital IT community, where the ability to justify a project’s technical impact to the organization’s infrastructure or workflow is key.

**Qualifications of an Informatics Leader**

As mentioned previously, the most important characteristics of informatics leadership are the creation and perceived value of a culture of close partnership between IT and clinical teams. Informatics leaders should ideally see their role as a bridge between the worlds of technology and clinical care. As such, they should be able to easily interact with each of the groups in the clinical environment, including physicians, technologists, finance, administration, and IT. Informatics leaders should work to understand each group’s needs, act as an advocate, and translate organizational needs between groups appropriately.

To attract the right physician informaticist candidate, it is essential to focus on IT as a strategic advantage to your practice. Such a focus is also critical in setting the tone of his/her efforts once in the organization. Although many organizations initially focus on system stability or even expansion as a primary responsibility, the next step is often forgotten. Stable infrastructure should be only part of an informatics leader’s responsibilities. Radiology, a technology-heavy endeavor, should value a candidate’s ability to create a culture of responsive customer service, to understand the impact of information systems to clinical workflow, and to translate current trends in technology to strategic opportunities. This may require a change in how your organization views IT.

**Roles and Jobs**

Organizations increasingly understand that recruiting the right team of IT professionals is a key to their success. One model published by Gartner suggested that successful IT teams should be made of up individuals with a focus and background in three areas: technology, behavioral science, and business [5]. Although every individual is a unique blend of interests and backgrounds, it’s useful to understand the makeup of an informatics team by adapting this model to clinical informatics.

**Technology Focus**

Technology-focused team members have a strong background in infrastructure expertise, methodologies, and systems architecture. They often act in a role of PC support or system administrator. They may have a background solely in traditional IT and may have gained experience with information systems outside of a clinical environment. They run the information systems, perform the backups and upgrades, and generally provide the day-to-day technical support and administration for your IT infrastructure. They can also implement new technology and keep it running. They are a strategic resource for vendor technology assessment and for designing architectures and are a must-have for both system stability and strategic informatics infrastructure.
Behavioral Focus

Behaviorally-focused team members may have a clinical background and often have high emotional intelligence and act in roles such as PACS administrator, application specialist, or trainer. They may understand the clinical need for technology better than the technical specifics of the systems architecture. Their background in clinical workflow makes them essential to quality and process improvement initiatives. An empathetic focus helps them understand clinicians and their needs for robust technology that improves their ability to impact patient care. They should have a working knowledge of the technical abilities of their clinical associates, as this will help guide workflow implementations with the appropriate level of technical complexity. They are a strategic resource for gauging the impact of new technologies on clinical workflow and a must-have to improve departmental processes and overall quality.

Business Focus

Business-focused team members often act in the roles such as RIS administrator, project manager, or director of IT. They may at one time have had a predominantly technology or clinically-focused position but shifted toward a more managerial role. Their background in either discipline has sparked an interest in financials, billing, or managing projects or people. Their business focus helps them understand the financial needs of the organization to assist with technology initiative metrics such as return on investment or total cost of ownership.

Roles and Skills Matrix

It is important to understand and balance the various roles and skills needed for a high-performance team of knowledge personnel. Not everyone on an informatics team will have a background and skillset in all aspects of imaging informatics. Understanding the types of roles, related backgrounds, and what to expect from each is essential.

**Desktop support:** This role is often responsible for PC support activities, including adding new desktop software for users, deploying new PCs, and troubleshooting PC performance issues. This is usually an entry-level position, and candidates often have varied levels of IT experience.

**System administrator:** This role is responsible for back-end system maintenance and stability. Common activities include server backups, adding new storage, monitoring performance issues, and maintaining stability in the servers or systems. This is usually a senior-level position. Candidates most often have a pure IT background.

**PACS administrator:** This role is often responsible for the day-to-day operations of the PACS. Common activities include ensuring proper image flow and repair, adding new modalities, and training of end-users. This is usually a more advanced role, and candidates often have either a general IT (e.g., desktop support) or clinical (e.g., technologist) background.

**RIS administrator:** This role is responsible for the day-to-day operations of the RIS. Common activities include ensuring proper reporting flow, debugging interfaces, setting up RIS resources and templates, and training of end-users. This is usually a more advanced role, and candidates often have a clinical background or other strong experience in clinical workflow.
RIS administrators can be crucial players in quality projects.

*Application specialist:* This role is responsible for training end-users in advanced imaging systems such as a PACS, RIS, or subspecialty advanced visualization systems. Strong behavioral skills and an understanding of learning patterns are required for success in this role. Application specialists should have a clinical/behavioral background and are critical to end-users’ successful use of clinical information systems.

*Digital imaging manager:* This role is responsible for importing and exporting imaging from and to external media and for reconciling/matching orders and images between PACS and RIS. This role reflects the expected transformation of the traditional radiology file room manager from shipping/receiving film (in a traditional film library setting) to moving digital images between physical media and devices.

*Informatics leader/director:* Ideally the manager, team leader, or IT director role should have experience in all of the above roles, having progressed through the ranks to see their current role as more than resolving individual issues or problems. The informatics leader should hold a strategic position in your organization and be able to work with the service line chair, CEO, or physician informaticist to help set and operationalize organizational goals. Successful candidates have varied backgrounds, which often include demonstrated career experience characterized by incremental progression in responsibilities.

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<td>Role/ Skill</td>
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<td>Applications Specialist</td>
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<tr>
<td>Digital Imaging Manager</td>
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<td>Informaticist</td>
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**Qualifications**

When building an informatics team, organizations often find it challenging to identify IT personnel who have the needed skills to become effective resources. Although the number of CIIPs is increasing, the demand for skilled knowledge personnel remains high and may exceed the availability of CIIPs in many geographic areas. Organizations should consider the following when building a team or even when adding a specialist.
**Basic Skills**

Many entry-level technology professionals offset a lack of real-world experience by completing IT certification programs such as CompTIA A+, a vendor-neutral computer technician certification, programs offered by Microsoft such as the Microsoft Certified IT Professional, or other product-based certifications. Although these certifications do not guarantee technical knowledge per se, they demonstrate an interest in professional recognition and may indicate interest in formal recognition and professional development.

**Advanced Skills**

For intermediate or advanced informatics team members, some imaging domain knowledge or advanced skills are necessary. Specific technical knowledge may be relevant on a site-by-site basis (e.g., knowledge of firewalls may be more relevant for practice sites that maintain their own networks, which is unlike university settings). Specific experience or knowledge related to imaging is desirable but may not be easily obtained in some job markets. The candidate interview is critical to gauge professionals’ prior roles and their expected fit in your organization. If the candidate has no health-care experience (but has strong technical skills), look for questions that probe his/her perspective toward customers. Sample interview questions include the following:

- **Tell me about a time when your system was down, and service had to be restored at all costs. What was that like? What did you do to provide great recovery and communication? What was your customer’s experience like?**
- **How do you view service disruptions in your systems?**
- **How important is technical support team customer service?**
- **Tell me about a time when you worked closely with your customers to jointly solve a problem.**

These and similar questions may be useful to understand the perspective and commitment level of potential candidates, especially when there is no strong health IT background or experience to discuss. Regardless, it’s essential to set expectations during the interview as to what type of role you are creating and what you anticipate from any candidate. If you expect your team member to carry a pager and be on 24/7 support (all while smiling and delivering great customer service), it’s good to discuss those expectations from Day One.

**Building an Imaging Informatics and IT Team**

The task of fostering a well-developed informatics and IT team comes with many of the organizational, budgetary, and interpersonal challenges faced by those operating at the interface of management, human resources, and technology. The goal of such an effort should be to maximize the effectiveness of a practice’s efforts in fulfilling its mission, which may include clinical, research, advocacy, and educational components. Ultimately, a well-balanced, efficient team:

- covers the core competencies required to fulfill that mission;
- minimizes risk of the failure of mission-critical technologies;
- anticipates the needs of a practice before they arise; and
- helps maintains a practice’s competitive advantage.
A new upstart imaging practice has the advantage of developing an informatics and IT strategy from the ground up, anticipating the need to hire individuals with various strengths to fulfill that strategy. However, more often, an informatics leader or champion is tasked with starting or developing such a team in an existing practice or department with established budgetary constraints, political structures, and organizational limitations.

How does one deal with a situation in which an informatics and IT team is not easily identifiable? With no team to handle an existing department’s needs, the situation can be alarming. If a department has been functioning without incident, there may, in fact, be a team tending to its needs. The distributed nature of the individuals contributing to IT and informatics needs may obscure the exact composition of the team. This is sometimes the case in large organizations. In such a case, it is worthwhile to identify the various individuals maintaining operations. Such individuals may be among hospital IT, administration, the radiology technologist staff, vendors, and contractors.

What if, after looking for a team, you only find one person? It is common practice to have one individual identified as the “radiology IT” resource. In rare cases, this individual is a true superstar with advanced IT, clinical workflow, business operations, and strategic skills. Practices able to retain such rare talent are fortunate indeed. It is more common, especially in practices with more limited resources, that a single individual has some basic IT and imaging IT skills and the judgment and communication skills to know when to get on the phone to seek help from other organizational resources or vendors. An imaging practice can likely maintain clinical operations indefinitely with such an arrangement. One resourceful individual with appropriate access to other IT professionals and vendors may be able to cover the core competencies required to fulfill an imaging practice’s basic clinical mission. However, such an arrangement leaves much to be desired. When a practice is dependent on one individual, that individual becomes a single point of failure. A practice that relies on an individual for IT tasks cannot effectively mitigate the failure risk of mission-critical technologies. Furthermore, unless the particular individual has extraordinary time-management capabilities, it is nearly impossible for one person to constantly anticipate the exact needs of a practice or help maintain a practice’s competitive advantage while also tending to daily operations.

What if you find a number of individuals who fulfill the needs of a practice but do so without coordination or leadership? In many practices, it is common to find the core IT competencies required for maintaining a mission shared between a few individuals. For example, there may be one person whose primary role is desktop and user support, another that serves as a PACS administrator, and yet another that serves as an RIS administrator. This circumstance is an improvement from the one in which a single individual is responsible for all of these responsibilities because with some basic cross-training, the department could likely survive the temporary absence or departure of any one of those team members without mission-critical technologies failing. However, effective cross training requires some coordination between these individuals and a common awareness of what it takes to make the department run. In other words, it requires these individuals to operate as a team, not just as a group of individuals.

In some cases, a group of individuals can coordinate its efforts and strategize for the future while maintaining a relatively flat organizational structure, i.e., without a defined leadership
Role. In most cases, a group of individuals requires active leadership. If your practice suffers from the absence of a designated IT leader other than a physician champion, the first necessary step is to evaluate the underlying cause. Has the practice staff grown organically over time, and the absence of a designated IT leader was simply an oversight? Is there a concern that someone promoted to a leadership role will require budgeting for a higher salary? Perhaps there is concern that identifying a single leader will alienate other members of the team? Identifying the underlying cause of the leadership absence will help prescribe the appropriate course of action. A physician champion may need to convince other members of the practice or organizational leadership that an IT leader is necessary to the point that the need outweighs their concerns. Such a leader can be recruited from outside the organization or groomed from within. With good leadership, a practice can move beyond simply covering core competencies and minimizing operational risk to anticipating needs and growing a competitive advantage. As discussed earlier, such a leader has a grasp of the technical landscape, excellent people skills, and strategic skills to keep up with a quickly changing landscape.

Remediating a Dysfunctional IT Group

The phrase “learned helplessness” has been used to describe many physicians’ attitudes toward IT systems and processes in health-care settings. It should be no surprise that there are a fair number of dysfunctional IT teams working in health care and imaging IT in particular. How does one recognize a dysfunctional IT group? This can be a challenge in itself. One avenue is to consider the relationships of the IT group with others in the imaging department and ask the following questions:

Do IT personnel feel comfortable going into reading rooms and discussing issues with radiologists? Do radiologists see IT professionals as obstructionists that put obstacles in the way of getting their jobs done? Or do they see the IT group as being on their team, working toward solutions? What about vendors? Does the IT team have a purely transactional relationship with vendors in which anything is possible if the practice pays for it, or do members of the IT team have an idea of products’ inner workings, future developments, and even a friendly relationship with their more important vendors? Does the imaging IT team have a good relationship with other IT groups (in particular the hospital IT team if it is separate)? Finally, a dysfunctional IT group may be so because of its interpersonal relationships. Are members of the team wasting valuable time and effort because of petty internal disputes, bickering, or turf battles?

Besides poor relationships and interpersonal skills there are a number of reasons for a dysfunctional IT team. Exhaustion, a poor knowledge base, difficult personalities, or poor leadership are among some of the many underlying issues that could lead to a dysfunctional IT team. Remediating such a team requires establishing at least a working theory of the underlying root causes of the dysfunction. There is no one-size-fits-all formula for remediating such a team, and every case may require analysis, corrective action, and re-evaluation.
Table 2. Remediating a Dysfunctional IT Group

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Potential root cause(s)</th>
<th>Potential interventions</th>
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</thead>
<tbody>
<tr>
<td>“Bluffing” about reasons for downtimes</td>
<td>Knowledge/skills gap</td>
<td>Conference attendance, CIIP</td>
</tr>
<tr>
<td>Radiologists don’t know IT staff</td>
<td>Poor service orientation, poor relationships</td>
<td>Daily IT walkthroughs in reading rooms</td>
</tr>
<tr>
<td>Outdated IT software</td>
<td>(1) Poor relationship with vendor</td>
<td>(1) Have physician champion and IT meet with vendor at major meeting</td>
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<td></td>
<td>(2) Lack of knowledge about latest offerings</td>
<td>(2) Assign staff to assess the “latest and greatest” technology</td>
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<tr>
<td></td>
<td>(3) Budgetary constraints</td>
<td>(3) Create justification for updating software in next budget cycle</td>
</tr>
<tr>
<td>Conflicting information from various IT staff</td>
<td>Poor communication among IT team members</td>
<td>Establish regular team meeting to discuss operations</td>
</tr>
<tr>
<td>Long turnaround time when dealing with active issues</td>
<td>(1) Poor issue tracking</td>
<td>(1) Consider tracking number of issues IT deals with on a weekly basis</td>
</tr>
<tr>
<td></td>
<td>(2) Understaffed IT team</td>
<td>(2) Evaluate clinical impact and determine if justification exists for new position</td>
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Summary

Regardless of the practice size or setting (private versus academic), your relationship with IT staff and your appreciation of how IT adds value to the practice mission is critical to the success of any IT strategy. Even practices that have a perceived mature IT infrastructure and staff should devote time and effort to performing regular IT needs assessments to ensure enough resources to support the current and future clinical activities. Under the current climate of cost restraints, government regulations, and declining reimbursements, strategic investment in IT may initially be perceived as an unnecessary luxury. However, as practices find it challenging to participate in utilization control and population management, some of the critical management and business intelligence needed to prevail in such an environment can only be derived from robust, interoperable IT systems. Growth through mergers and acquisitions and increasing demand for high-volume, high-quality, low-cost care drive differentiation between successful and failing practices, and success may hinge, in good part, on your practice’s capability to effectively leverage IT.

References


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