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Solid groundwork leads to rapid PACS acceptance

Even after initial 'go live' date, multidisciplinary project team members must continue providing support to end-users

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The introduction of PACS in a hospital opens up a new world for its users. The impact of PACS on the organization is huge. The new system brings about a dramatic change in workflow, and users must invest time and effort in learning to work with it.¹

The return on investment with PACS makes these efforts worthwhile. The benefits of PACS are tangible throughout all levels of a healthcare organization. Most important, the availability and accessibility of images and reports is increased, leading to better quality patient care and time savings for radiologists, technicians, and referring physicians.

PACS is also an excellent tool for training purposes. A report by a trainee radiologist, for example, can be labeled as "dictated" in the system. The report's status may then be changed to "validated" when it has been checked by a radiologist. The "track revisions" function can be used to show trainees how their initial report was altered.

PACS ROLLOUT

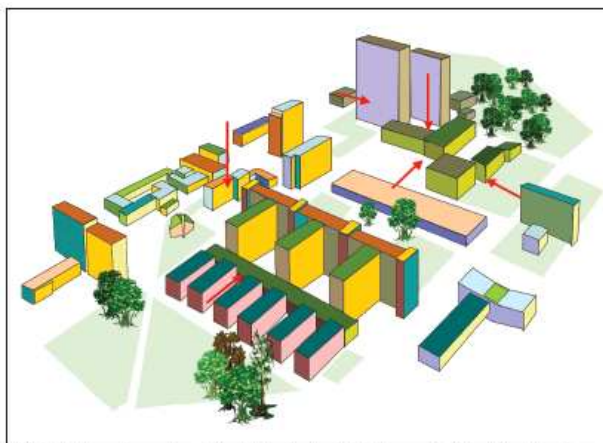


FIGURE 1. Schematic overview of Ghent University Hospital. Red arrows indicate different locations of radiology department.

PACS was introduced at Ghent University Hospital, where it was integrated with the RIS and speech recognition system. The PACS (GE Centricity) went live in the radiology department in March 2005. Hospital physicians were given access to the PACS in July 2005. The radiology department stopped printing film on 15 Feb. 2006.

Ghent University Hospital is the second largest single-campus hospital in Belgium. It employs around 4900 people (660 physicians and 1500 nurses) and has a capacity of 1062 inpatient beds plus 100 beds for outpatient procedures.

The hospital consists of more than 40 separate services. These are being reorganized into eight larger sectors according to their function. For example, the imaging departments (radiology and medical imaging, nuclear medicine, ultrasound, radiotherapy), laboratories (clinical biology, pathology, medical genetics), and pharmacy (pharmacy, biomedical service) have now joined together to form the "Clinical Support Sector."

The radiology department is dispersed over several locations throughout the campus (Figure 1). The department is staffed by 36 radiologists, 15 of whom are completing their subspecialty training, as well as 43 nurses, 18 technologists, three engineers, and 21 clerks. It provides CT scanning, conventional radiography, ultrasound, MRI, PET/CT, mammography, neurovascular/ interventional imaging, and pediatric radiology.

GROUNDWORK



FIGURE 2. Radiologist-in-training uses PACS workstation.

A multidisciplinary PACS project team was set up to guide the implementation process from start to finish. This team consisted of the head of the radiology department, the department's head nurse, two technicians, and two engineers. It was later expanded to include a psychologist and a third engineer.

The team identified two distinct types of PACS users: radiologists and referring physicians. Radiologists use PACS throughout the day to report images, look up previous imaging studies for comparison, and tutor residents. They view the images on radiological workstations (Figure 2). Referring physicians consult current and previous images and/or reports on a normal PC via web browser technology, as and when required.

Radiologists were given the opportunity to follow a training course or have hands-on training provided by application specialists from the PACS project team. It proved difficult to train the radiologists in this way, however, so we sought alternative methods to train the physicians and developed a digital learning environment (Figure 3).² This tool was easily available; users could consult it from wherever they were, whenever they wanted. They did not have to wait until the next training session to find solutions to problems, and they were able to learn step by step at their own pace.

The physicians were given access to the PACS whether or not they had also consulted the e-learning tool. Preliminary research indicates, however, that those who used the e-learning tool had more positive perceptions of PACS.³

Two additional visual aids were developed for the PACS users: a blotting pad and a mouse mat. The blotting pad provides a quick and logical overview of the most common functions of PACS, including how to open a study and how to manipulate images. The mouse mat gives an overview of the most important actions that can be performed using the mouse.

The IT department upgraded all of the hospital's computers so that they would meet the minimum requirements to work with the PACS.

ONGOING SUPPORT

The work of the PACS project team did not finish when the system went live. When users are exposed to a new technology for the first time, their attitude toward that technology is most susceptible. The project team recognized that PACS users who had yet to become proficient might get frustrated and develop negative feelings toward the system if nobody was available to support them when they had problems. This provision of support remains an important task.

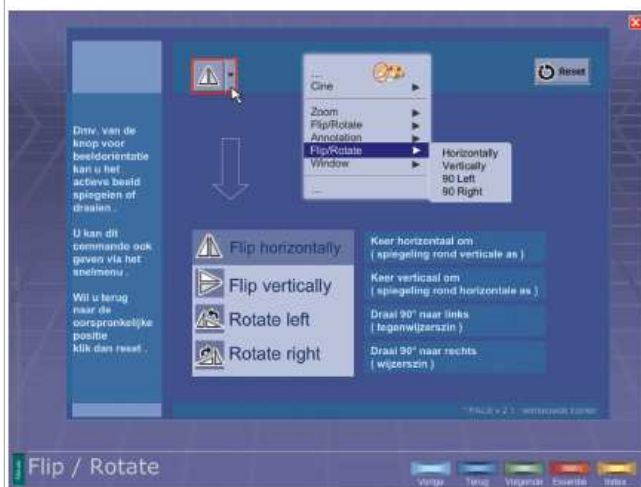


FIGURE 3. Sample slide of digital learning environment (in Dutch) shows users how to flip or rotate image.

Project team members attended staff meetings of every service in the hospital on three separate occasions immediately after the introduction of the PACS. These visits had multiple aims: to promote the project team, to solve user problems, and to show some advanced possibilities of PACS.

A 24/7 support system was installed as well. Users are provided with a telephone number that connects them directly to a member of the PACS project team. Problems can be detected easily and resolved quickly. Issues that occur frequently are

considered for inclusion in the e-learning module. This feedback loop ensures that the hotline is not swamped with the same questions repeatedly.

The project team also monitors information input into the PACS on an hourly basis. This step safeguards the system and ensures that all images are located where they are supposed to be.

JUDGMENT DAY

A study was set up to assess the users' verdict on the PACS at different times during the implementation process. It was also hoped that the study would indicate those factors that influence users' acceptance of PACS.

We issued questionnaires to radiologists and referring physicians before the PACS implementation and again about one year after the radiology department stopped printing film. Referring physicians also received an additional questionnaire shortly after the introduction of PACS to the hospital. The survey included scales to measure how the users perceived the usefulness of PACS, ease of use of PACS, social pressure to use PACS, and the availability of support.⁴⁻⁶

Prior to becoming PACS experts, physicians rated the usefulness of PACS as the most important factor in their acceptance of the new technology. Their views changed, however, when the system was introduced and they became more familiar with the technology. Availability and provision of support were then most likely to influence PACS acceptance, with the usefulness of PACS being the second most important factor.

For both radiologists and referring physicians, the mean scores on all scales (usefulness of PACS, PACS' ease of use, availability of support, etc.) improved over time. This indicates a positive evolution of the implementation process. The mean scores of the radiologists were higher than those of the referring physicians.

In conclusion, the setting up of the project team was a major factor in the successful introduction of PACS at Ghent University Hospital. Not all of the success can be attributed to our approach, though. Part of the credit must be taken by the PACS itself.

It can take some time for radiologists and physicians to become proficient in using PACS, but the benefits of the system can be seen right from the start. The only difficulty is the length of the transition period, during which film is still printed. This period should be long enough for end-users to make the switch but also short enough for costs to be contained. One way to evaluate whether end-users are ready to make the switch is to set up an acceptance study.

The take-home messages from our own experience are clear. Well-prepared end-users will facilitate the PACS implementation process. End-users need time to adapt to film-free workflow. Possible sources of frustration should be minimized, for example, by the provision of adequate equipment, training, and support for the PACS users. Most important, the implementation process is not over when the PACS goes live.

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- References
1. Siegel E, Reiner B. Work flow redesign: The key to success when using PACS. *AJR* 2002;178(3):563-566.
 2. Devolder P, Pynoo B, Voet T, et al. Optimizing physicians' instruction of PACS through E-learning: cognitive load theory applied. *J Digit Imaging* 2009; 22(1):25-33.
 3. Pynoo B, Devolder P, Adang L, et al. E-learning: a way to speed up clinicians' acceptance of a picture archiving and communication system? Presented at the 21st Computer Assisted Radiology and Surgery (CARS) International Congress and Exhibition, Berlin, Germany; June 2007:S511.
 4. Duyck P, Pynoo B, Devolder P, et al. User acceptance of a picture archiving and communication system. Applying the unified theory of acceptance and use of technology in a radiological setting. *Methods Inf Med* 2008;47(2):149-156.
 5. Duyck P, Pynoo B, Devolder P, et al. Monitoring the PACS implementation process in a large university hospital —Discrepancies between radiologists and physicians. *J Digit Imaging* 2008;Oct 28. [Epub ahead of print]
 6. Duyck P, Pynoo B, Devolder P, et al. [Do hospital physicians really want to go digital? Acceptance of a picture archiving and communication system in a university hospital.] *Rofo* 2008;180(7):631-638. German.

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