The 3rd Healthcare Digital Libraries Workshop, held in conjunction with the 9th European Conference on Research and Advanced Technology for Digital Libraries (ECDL 2005) in Vienna, Austria, was the third event in the series of workshops bringing together researchers and medical professionals with interests in healthcare digital libraries. HDL 2005 consisted of an interesting mixture of talks and stimulating discussions that again demonstrated the need for collaboration between the digital library (DL) technical and usability communities essential for developing successful real-world healthcare DL projects. During the one-day conference, the HDL morning session was devoted to technical projects while the afternoon session featured talks from the usability end of DL research areas. The day concluded with a lively discussion session, chaired by Mick Khoo (University Corporation for Atmospheric Research), who highlighted the need to bridge the gap between the usability and technical communities.

The workshop keynote talk was delivered by Heiko Schuldt (University for Health Sciences, Medical Informatics and Technology (UMIT)), whose talk was entitled “Advanced Digital Libraries in Healthcare and their application to Virtual Electronic Health Records and Telemonitoring”.

Heiko started by giving a historical overview of digital library architecture technical development, with implications for healthcare systems. This included health records, image databases and supporting advanced image processing to provide image-similarity search and DL support for laboratories to enable virtual integration of healthcare resources. In addition, he discussed how the potential of up-to-date DL technology enables virtual collections, dynamic composition of services, dynamic adaptation, 24x7 service, context-awareness and sensor data collectors. At the technical level, this functionality is supported by Web service composition, based on HTTP/XML and SOAP architectures and utilizing the following key three technologies: 1) Service-oriented architecture (SOA), 2) Peer to Peer (P2P) network architecture, and 3) computational, data and service Grid infrastructures. Therefore, digital libraries of the future will be fully distributed with no global control (i.e., with no single point of failure), having no central censorship enabling support on-demand computing.

In the second part of his talk, Heiko presented OSIRIS – a healthcare DL project developed at UMIT, Austria. Built on three cornerstone technologies (SoA, P2P and Grid), the OSIRIS system provides an infrastructure for semantic service composition without centralized control or execution of processes, in a “plug in and play” style. Load balancing is achieved through locally and globally available workload information. Key applications using the OSIRIS infrastructure (in the process of implementation in Austria in 2002-2009) include health@net (continuously monitoring and supporting patients with several chronic diseases such as diabetes, hypertension, etc.) and electronic patient records.

Thorsten Moeller (UMIT) presented CASCON, an EU-funded joint collaboration project between UMIT, Austria and the German Research Centre for AI, Germany. His talk focussed
on the technical aspects of CASCON’s implementation of a context-aware semantic Web service, composition and co-ordination. The system uses agent-based technology for the on-demand, distributed-process execution of healthcare service delivery to patients. In particular, semantic service composition features include: service co-ordination (discovery of advertised services), service composition (agent-based runtime match-making according to pre-defined quality-of-service constraints) and decentralized compound service execution. The infrastructure is based on P2P network technologies, agent technologies and OWL (Web Ontology Language) service description.

Steve D’Souza (City ehealth Research Centre, City University, London) presented the use of agents in the healthcare digital library management of the National Resource for Infection Control (www.nric.org.uk). NRIC is a UK DoH-funded, Internet medical digital library that provides a single point of access to quality-appraised, evidence-based information within the field of infection control. Automation and seamless management of the quality review process is implemented by agents allocating new resources to reviewers by matching MESH-based resource indexes against a group of reviewers defined by their areas of expertise. In addition, agent-based personalization enables alerting users by email (specific to profession, medical speciality and individual choice of topics) of new resources posted on the NRIC that are digital-library-based. The Professions Weblog Agent and Specialities Weblog Agent regularly evaluate the Domino R6 web server weblogs, identifying interests in certain topics to configure the alert function to complement user-defined preferences.

The last presentation, in the technical part of the workshop, was given by Dr. George Buchanan (Swansea University). This very interesting presentation highlighted the importance of appropriate design for health digital library alerting mechanisms. The architecture for this mechanism was presented based on findings from several studies with clinicians (i.e., doctors, nurses, and allied health professionals) and patients within the UK, Germany and New Zealand. The user studies were completed by Doris Jung (University of Waikato) and Dr. Anne Adams (University College London), and the alerting architecture was developed in conjunction with Dr. Annika Hinze (University of Waikato). One key aspect of the system presented was a ‘press alert’. Here, a profile is used to support the alerting service, filtering newspaper digital libraries (e.g., Nexis) for relevant new press releases. These new press articles are then used to filter medical digital libraries (e.g., Medline). Following the filtering process, clinicians are sent both the new press release and relevant up-to-date research results as they occur. These findings demonstrated the importance of context, both in terms of the user’s task and immediate environment.
In the HDL workshop’s afternoon session, Dr. Simon Attfields (University College London Interaction Centre) work was presented by Anne Adams (UCLIC). The study highlighted some very relevant findings from patient studies that were conducted with users between ages 25 and 81. The patients’ information behaviours were identified and related back for health digital library design possibilities. The findings identified that patients do not randomly, out of context, search the Internet for health information regarding specific and non-specific conditions. Patients were identified as focusing their information searching behaviours around real-world events, namely after consultation with a doctor. Before their initial consultation, patients sought information that would help them decide: whether they were ill enough to need medical intervention, from whom they should seek help, and what information they would require in the consultation. Patients sought further information after the consultation, namely: verification for the diagnosis and treatment along with information to support managing their condition.

The next HDL presentation in the afternoon discussed joint research by Nandish Patel (Brunel University) and Patty Kostkova (City ehealth Research Centre, City University, London) on the Deferred Actions of the design of the National electronic Library of Infection (NeLI) (www.neli.org.uk). Investigating the development of the NeLI digital library in the UK, the authors argued that theoretical system design did not meet the needs of system development in a real world setting. By investigating project documentation, internal and formal specifications, and informal email discussions where the key NeLI technical decisions were made, it was discovered that the digital library design was rather unsystematic. Applying Purao’s standard descriptive model of design and comparing the NeLI design process with the Theory of Deferred Action, it was revealed that rather than design being systematic, it was subject to deferred action as a result of changing user needs and social, political and financial factors.

The final paper of the day was by Anne Adams who presented some of her findings about the role of security, and specifically about authentication, in medical digital libraries. The importance for health digital library security and authentication of organizational communication, and understanding both informal and formal community work practices, was discussed in more detail. Poor communication and design of authentication systems was noted as not only impeding clinicians work practices but allowing security to be utilized inappropriately within the clinical social structure. Valid users were identified as obstructed from digital library use because of poor communication of procedures and poor design of systems. Security and, in particular, authentication procedures were also inappropriately ‘used as a weapon’ by senior clinicians against junior clinicians’ access to DL information. A key factor identified is that authentication applications and procedures are poorly designed, unusable and not well understood by end-users.

Near the conclusion of HDL, a discussion was led by Mick Khoo (UCAR) about the interesting convergence of both technical and user-centred perspectives on health digital libraries revealed in the HDL ‘05 presentations. Communication between these two perspectives was identified as critical within this domain. A bridge between these two perspectives is critical for effective designs of health care digital libraries that will also be safe for end-users. The barrier between the two approaches was noted by some as an issue of the different terminology used by technical designers and end-users. The agent, semantic web delegates were noted as emphasising the importance of ontologies in their design process. Khoo argued by that many user-centered methodologies result in more or less formal
ontological descriptions of the concepts and relationships that exist between users, technology, stakeholders and work practices. The jump between the two, it could be debated, involves ontologies with end-users or agents at the core. In time, maybe the answer will be found to be merged ontologies.