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Harry Bruce is the Dean of the Information School of the University of Washington, Seattle. The UW Information School (iSchool) is an academic community comprising diverse disciplines, professional fields, and areas of expertise engaged with the study of information and its use by people and organizations. The teaching, research, and service activities of the iSchool are focused on helping people to more effectively use information and technology to complete tasks, achieve goals and enjoy life.

Harry Bruce's research focuses on human-information behavior, information seeking and use, and personal information management in networked information environments and the Internet. His research has been funded by the National Science Foundation, the Institute for Library and Museum Studies, and the Australian Department of Employment Education and Training.

GRL2020 Position Paper

In this position paper I am writing from the perspective of a researcher, research facilitator, and academic leader. There are, of course, many dimensions of a vision for Global Research Libraries in 2020, but I want to focus upon three specific opportunities for supporting and facilitating research, scholarship, and creative work.

In recent years, I have engaged in two research projects (funded by the National Science Foundation) that inform my vision for Global Research Libraries in 2020. The first was an exploration of collaborative information retrieval: how teams engage in seeking and using information that is needed to resolve an information need or problem shared by all members of the team. The second is a research program that focuses upon the challenges of personal information management: how individuals face the challenge of organizing and managing information that they decide has enduring value in their lives, whether professional or personal. This second set of research studies examines how individuals assemble and organize their personal information collections. During this same period, I have also worked with a variety of research teams where it was my job to facilitate, support, and foster intellectual and creative engagements between team members and to build research programs. I have been a keen observer of the research process, particularly on larger scale, multidisciplinary projects focused on complex problems. I have an understanding of the support needed by these research teams, their challenges, and the work processes they engage. I have also observed the trends that are shaping new processes of scientific enquiry based on interdisciplinary collaboration, computational simulation, sensor technologies and the manipulation of huge data sets. My vision for Global Research Libraries in 2020 is to keep ahead of these trends that are shaping scientific enquiry and to remain a key, active, relevant and value-adding component of the research process. With this in mind, I would like to recommend a small number of actions that should be taken by research libraries and academic librarians. This is not a complete set of actions, of course. My intention in this position

paper is simply to introduce a few ideas that will hopefully generate further discussion at the second GRL 2020 workshop.

My first recommended action is that the research library must become relevant to a new generation of users variously referred to as digital natives, millennials, etc. Research libraries have traditionally focused on meeting the needs of their users by better understanding their needs and their preferred methods for finding and using information. In 2020, all undergraduate and graduate students and most assistant and associate professors (i.e. the majority of scholars who use research libraries) will be members of a generation who have grown up 'digital'. Emerging research is telling us that this new generation of library users learns differently and processes information differently. They communicate differently, solve problems differently, write differently, and use appropriate information technologies to serve their needs in unanticipated ways. It stands to reason that this generation of research library users will create new knowledge differently and transfer it to others with methods that will further transform scientific enquiry and scholarly communication. They will need a very different set of library services to support their needs and their work processes. The Global Research Library in 2020 must understand and anticipate the needs of this new generation—how they learn and use information will fundamentally affect the future of research libraries and the practices of academic librarianship (reference services, information provision, collection development, etc.).

My second recommended action may appear to contradict common assumptions about the library as place in a digital information world. Some have argued that the research library is less relevant as a place and as a space when users can easily access digital information anywhere or anytime, and express a preference for finding and using information on the move. It is true that digital information provides incredible scope for the development of off-site information services (a vital aspect of the vision for global research libraries 2020 not covered in this position paper). This does not mean that the research library as a physical space is irrelevant. Indeed, I want to emphasize the importance of re-designing and including collaboration spaces in research libraries. In 2020 research libraries will be spaces where research teams assemble. The creative processes of problem solving, scholarship, and research are increasingly dependent upon collaborative, intellectual, face-to-face engagements conducted within specially designed spaces, augmented by technologies that provide shared access to information and that capture the new knowledge generated there. It is true that researchers assemble around technologies that provide access to digital information but much of the creativity required for transforming this information into new knowledge comes out of face-to-face interactions. My vision for GRL 2020 includes flexible physical spaces that can easily be transformed into research 'collaboratories'. These spaces will be loaded with technologies (or the technologies can readily be assembled into these spaces) that facilitate and support shared access to and engagement with information, knowledge generation, new knowledge capture, publication and transmission.

My final recommendation relates to the first two recommendations: the global research library in 2020 must play a fundamental role in shaping and supporting the e-sciences. A new paradigm for scientific enquiry is emerging where the scientist in a field (now most characteristically the natural sciences) has access to huge data sets obtained and captured by environmental sensors. This raw data is organized, managed, manipulated, and studied by one or several related disciplines or fields, adding value in the form of new knowledge. Then this new knowledge becomes the raw material for the accumulation of further new knowledge by a host of related and unrelated disciplines. Tony Hey's presentation at the first GRL 2020 workshop in Seattle referred to this as data-centric science (collaborative, networked, and multidisciplinary science). This new science will be transacted by the new generation of research library users (digital natives). It will require a re-definition of the research library as space, and it will place different demands upon the traditional practices of research librarianship (e.g. knowledge organization, collection development, information provision). It will also demand of the research library a new set of practices and roles related to direct contact with and management of vast amounts of unprocessed data.

In conclusion, the three points I wanted to make in this position paper do not, of course, sum up or capture the complete future of global research libraries. Rather, they are designed to stimulate discussion at the second GRL 2020 workshop in Tirrenia. The general proposition that I take in this paper emphasizes the fundamental importance of space, collaboration, and engagement for

the future of research libraries. This should not be interpreted as a non-global view of the research library. I do emphasize the importance of local support for active researchers within the orbit of a research library; however, this local support must connect the research process and members of a research team to collaborators, stakeholders, and audiences globally. The need for this local support for global scholarship, research, and creative work will inevitably increase in the coming years with the growing proportion of digital natives active in our research communities. There may be less need for face-to-face interaction among this new breed of researchers but, for now, this older generation researcher admits to preferring face-to-face intellectual engagements that seek practical outcomes – outcomes that advance the work of research libraries. To that purpose, I look forward to our meeting at Tirrenia and the second GRL 2020 workshop.