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Considerable change has affected universities and academic libraries in recent years, and the pace of change is only likely to accelerate. The significant changes affecting academic libraries include the following:

- Increasing client expectations, with the consequent need to maintain and enhance the student experience.
- Disintermediation and the invisibility of library support in the digital age.
- Current and future generations of students and researchers considering themselves self-sufficient in information skills.
- The decline in the importance of the library as a physical entity.
- Changing user needs and working styles.
- The availability of alternative sources of information for learners and researchers, with other providers in the digital environment and the library no longer being the principal information provider.
- The changing nature of universities, with new ways of working, changes in pedagogy and increased online delivery.
- Greater remote working with a requirement for 24/7 access on a range of personal devices.
- Library users shifting from being consumers to creators of content.
- Changes in scholarly publication (e.g. open access) and the research environment.
- Rapidly changing technologies and personalisation approaches. Use of some technologies (e.g. social media, mobile technologies) particularly favoured by younger students.
- Requirement for greater integration and interoperability of systems.
- Financial uncertainties and institutional cutbacks.
- Increasing emphasis on efficiency gains, value for money, accountability, impact, and evaluation and monitoring of performance and effectiveness. Importance of student retention.

At the time of writing, the coronavirus pandemic was causing considerable concern and major changes to the ways in which society operates. The consequences of the pandemic are likely to be far reaching for higher education, not just financially, but also in terms of the impact on student recruitment, ways of working and studying, the provision of support, and, potentially, the increasing importance of technological solutions.

Academic libraries have shown great ingenuity in taking up and implementing a range of technologies to help deal with or alleviate these trends, to meet the
needs of their users and to support the aims and objectives of their universities. The adoption of different technologies in academic libraries has expanded considerably. Early automation work focused on areas such as library management systems, but in 2020 the use of technology applications is extensive. There is large-scale use of different systems, devices and software such as self-service technologies, repositories, mobile devices and social media. Academic libraries have moved from being collections-based to more service-based, with a wider range of services to users including research data management, bibliometrics, open access presses, virtual reference and digital literacy. Libraries have moved focus from physical to online collections, with provision of access to an increasing range of electronic resources. Moreover, areas such as artificial intelligence, the internet of things and wearable technologies present opportunities and challenges for the future.

The success of academic libraries will increasingly be contingent on their ability to thrive in a technology rich environment. This book aims not just to concentrate on the technologies themselves, but to consider fully the change management issues relating to their implementation and use. Coverage will include consideration of leadership and management, planning and implementation processes, staffing and organisational issues, financial aspects, culture, skills and values, and the impact on services, staff, users and the organisation as a whole.

The literature relating to technology, change and academic libraries is fairly substantial and complex and can be difficult for the nonexpert librarian or librarianship student to gain access to and understand. I have tried to deal with this by taking a similar approach to the one I used in previous volumes on quality and academic libraries (Atkinson, 2016) and collaboration and academic libraries (Atkinson, 2018). A wide-ranging introduction and overview of the area is provided, followed by a series of case studies giving a practical approach and up to date and reflective content for the more experienced information professional. Hopefully, the book will present varied perspectives, information on the ‘who’, ‘why’, ‘what’ and ‘how’ of technology and change in academic libraries, and the skills required.

The book also seeks to offer a relevant approach for a wide readership by the following:

• Providing accessible content within the overview, and including identification of the more readable articles in the references and further reading sections.
• Providing signposts to the key themes and trends, key developments and key resources.
• Covering the different aspects of technology and change in academic libraries. There is a general consideration of the application of change management principles in academic libraries, and the wide-ranging case studies look at the adoption of different technologies, the impact and significance of the changes made and the change processes used.
• Providing information on the context and changing environment in which academic libraries are operating. Where appropriate, the contributors consider the political, economic and social aspects of the technological developments in academic libraries, the changing nature and requirements of students and other users, the changes in teaching, learning,
research and scholarly communication, and the changes in roles, responsibilities and organisational structures of libraries and librarians.

- Taking a UK focus but including international perspectives. Although the editor and a number of the contributors are from the United Kingdom, the book also includes a contribution from Ireland and a number of contributions from Australia. The coverage of the literature in the overview and further reading sections is international in scope.

I thought it would be helpful if I asked the contributors to adopt an approach of critical reflection, where appropriate. This method was also used in the previous books, *Quality and the Academic Library* (Atkinson, 2016) and *Collaboration and the Academic Library* (Atkinson, 2018). Much of the literature relating to technology, change and academic libraries very usefully describes and analyses developments in the field. Although this approach is also taken here, in addition, I asked contributors to reflect on their technology developments and projects as well as the implications, impact and significance of the work carried out. I hope this will help readers to gain a deeper understanding of technology and change involving academic libraries and of the benefits and constraints of different approaches and methods, to reflect on their own previous technology and change projects, and to plan future initiatives.

The ideas of reflective practice and critical reflection have been used increasingly in recent years in a number of professional fields, including health and care sciences. The development and understanding of specialised knowledge are essential for professional practice, and using approaches of self-consciousness (reflection) and continual self-critique (critical reflection) have been found to be useful to the development of continuing competence (Williams, 2001). In contrast, reflection has had less attention in the management and leadership literature with managers often placing more emphasis on action and outcomes (Gray, 2007). With some exceptions, there has also been little use in librarianship and information science (Greenall & Sen, 2016; Sen, 2010). The pace of change in organisations and the day-to-day demands of the workplace often leave little time for reflection.

The aims of critical reflection are for practitioners to understand the nature and meaning of practice; correct and improve the practice through self-reflection and criticism; generate models of good practice and theories of application through reflection and critique of actual occurrences. Critical reflection has three phases: a descriptive phase, with descriptions of practice or events; a reflective phase, with reflective analysis of events or situations; and a critical phase, with a critique of practice (Kim, 1999).

I used this approach and, in particular, Borton’s Developmental Model (1970) of ‘What? So What? Now What?’ to develop a simple critical reflection framework for the contributors to this book to help them in the writing of the chapters and case studies. This framework is given in the following table. Additional references on critical reflection are given in the “Further reading” section at the end of the book.
| Critical reflection element | Questions |
|-----------------------------|-----------|
| **What?** Description       | - What were the activities and services that were being looked at as part of the innovation and development?  
                            | - What were the aims and objectives, rationale and context for the work?  
                            | - How was the work planned, funded and carried out?  
                            | - What methods were used?  
                            | - What were the outcomes of the work?  
                            | - Who carried the work out?  
                            | - Who else was involved?  
                            | - What was my own role in the work?  
                            | - What did I do? |
| **So what?** Analysis       | - Was the planning and implementation work for the innovation and development effective?  
                            | - Have you carried out any evaluation of the work?  
                            | - What worked well?  
                            | - What worked less well?  
                            | - What lessons were learned?  
                            | - What were the challenges, barriers and risks in carrying out the work?  
                            | - What were the key issues relating to leadership and management and the attributes, skills and behaviours of the participants involved in the work?  
                            | - Were there any important issues relating to values or ethics during the work?  
                            | - Were the methods used for the development or innovation adapted during the work as a result of experience gained?  
                            | - On reflection, did the methods used work as originally intended?  
                            | - How would I do the work differently if I was to do it again?  
                            | - What different methods/approaches would I use?  
                            | - What would be your main conclusions and recommendations arising from the work on the development? |
| **Now what?** Synthesis     | - What were the benefits of the work?  
                            | - What changes have been made as a result of carrying out the innovation and development work?  
                            | - Of the changes made what has worked well and what has worked less well?  
                            | - What has been the impact and significance of the changes made?  
                            | - What has been the impact of the work on library services, systems, collections or spaces?  
                            | - What has been the impact of the work on university teaching, learning and research and on the university as a whole? |
| Critical reflection element | Questions |
|-----------------------------|-----------|
|                             | • What has been the impact of the work on library staff and users, roles and responsibilities, organisational structures and skills, capabilities and behaviours?  
• What potential is there for follow on work? |

**References**

Atkinson, J. (Ed.), (2016). *Quality and the academic library: Reviewing, assessing and enhancing service provision*. Oxford: Chandos Publishing.

Atkinson, J. (Ed.), (2018). *Collaboration and the academic library: Internal and external, local and regional, national and international*. Oxford: Chandos Publishing.

Borton, T. (1970). *Reach, touch and teach: Student concerns and process education*. New York: McGraw-Hill.

Gray, D. E. (2007). Facilitating management learning: Developing critical reflection through reflective tools. *Management Learning, 38*(5), 495–517. Available from https://doi.org/10.1177/1350507607083204.

Greenall, J., & Sen, B. A. (2016). Reflective practice in the library and information sector. *Journal of Librarianship and Information Science, 48*(2), 137–150. Available from https://doi.org/10.1177/0961000614551450.

Kim, H. S. (1999). Critical reflective inquiry for knowledge development in nursing practice. *Journal of Advanced Nursing, 29*(5), 1205–1212. Available from https://doi.org/10.1046/j.1365-2648.1999.01005.x.

Sen, B. A. (2010). Reflective writing: A management skill. *Library Management, 31*(1/2), 79–93. Available from https://doi.org/10.1177/0961000614551450.

Williams, B. (2001). Developing critical reflection for professional practice through problem-based learning. *Journal of Advanced Nursing, 34*(1), 27–34. Available from https://doi.org/10.1046/j.1365-2648.2001.3411737.x.