learning
spaces framework

learning in an ONLINE world

MCEETYA
Australia - New Zealand

Spaces shape and change practice. Engaging, adaptable spaces energise students, teachers and the community. Well-designed learning spaces inspire creative, productive and efficient learning.

learning spaces framework

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contents

List of Diagrams

context

Contemporary learning – learning in an online world describes the integrated nature of the highly technological world in which young people live and learn. A key priority is to design learning spaces that integrate technologies: engaging students in ways not previously possible; creating new learning and teaching possibilities; enhancing achievement and extending interactions with local and global communities.

The *Learning spaces framework* is designed to guide high-level strategic decision-making in jurisdictions and schools. It provides advice on key issues to consider when planning new schools, major redevelopment projects, and refurbishing or repurposing existing learning spaces in schools.

Learning spaces, both physical and virtual, are the planned environments in which learning takes place. 21st century learning requires new spaces that connect school, home and community learning, increasing flexibility and supporting learning outside the boundaries of school buildings and beyond the conventional school day.

Changing demographics, social interaction and student learning styles require greater flexibility in schools. Today's students represent the first generations to grow up in a world where information and communications technologies (ICT) are ubiquitous.

Students approach their lives and their daily activities differently. Mobile technologies, computers, video gaming, digital music players, video cameras, chat, blogs, wikis and virtual spaces are intrinsic to their world. Current technologies shape their expectations and their abilities to access, acquire, manipulate, construct, create and communicate information.

The social nature of learning is enhanced in spaces that encourage both formal and informal communities. Technology, now more mobile and affordable, facilitates greater access to content and resources with real-time communication and collaboration. Interior design, furniture and learning space management are important considerations.

Designing for Learning

Maximising student learning is at the heart of decisions about the design or re-design of learning spaces. The skills students acquire are influenced by the design of learning spaces, the effective use of ICT and the ways in which leaders change the nature and culture of schooling to reflect the needs of learners in the 21st century.

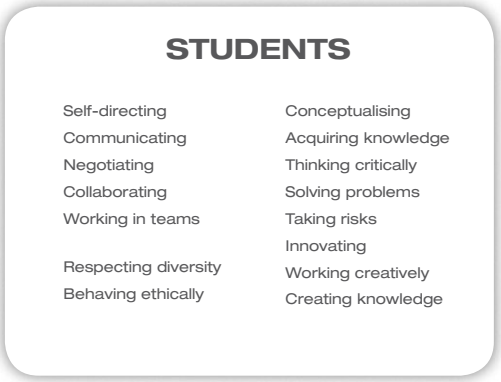


Figure 1: Student Learning

Learning is enhanced, deepened and made more relevant when connected learning spaces provide opportunities for:

- active and interactive participation
- collaborative project work
- information retrieval and sharing
- discussion and presentation
- production of new knowledge
- teacher and student-led activities
- connection with experts
- local and global networks
- personalised learning.

Guiding Principles

The following principles constitute a high-level strategic guide for the design of new schools, the re-development of schools, and the re-purposing of buildings and learning spaces to maximise student performance.

Flexibility - supporting

- multiple users and use
- physical, virtual and blended learning environments
- space re-allocation and re-configuration.

Inclusivity – accommodating

- access and participation for all
- local demographic needs
- personalised learning.

Collaboration – enabling

- cooperative learning, teamwork and enterprise
- community, professional and expert engagement
- local, national and global networks, partnerships and learning communities.

Creativity – achieving

- engagement, innovation and learning
- community and environmental harmony
- growth of social capital.

Efficiency– delivering

- faster, deeper learning
- sustainable, cost-effective utilities and delivery
- effective management and administration.

Decisions about the design or re-design of physical and virtual learning spaces are made within the context and policies framing the operation of schools, and changing the culture of schooling.

learning spaces framework

Different spaces are required for effective learning in the 21st century.

The *Learning spaces framework* uses four organisers to raise key issues that need to be considered as the guiding principles are applied.

Organisers:

- changing the culture of schooling
- creating ICT rich learning spaces
- designing spaces for learning
- planning and decision-making.

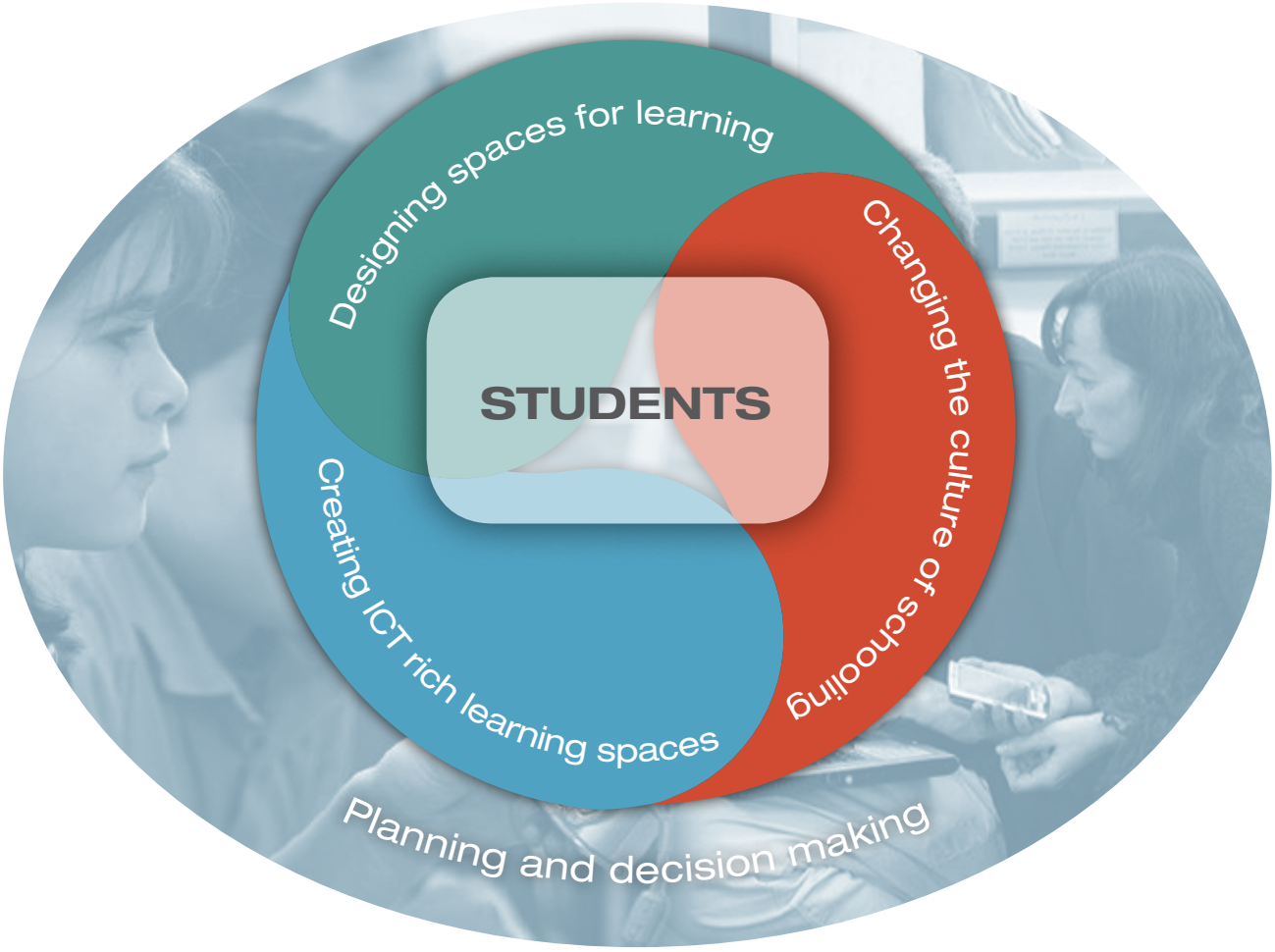
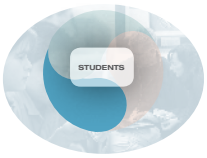


Figure 2: *Learning spaces framework*

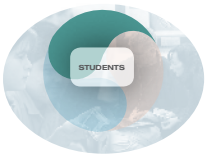
Changing the culture of schooling requires educators, planners, architects and the community to consider:

- learning beyond the boundaries of the school and the conventional school day
- new pedagogies, learning goals and worksites
- transformative leadership strategies and practices.



Creating ICT rich learning environments requires educators, planners, architects and the community to consider:

- networked communities
- flexible access to learning
- efficiencies using digital content, tools and services.



Designing spaces for learning requires educators, planners, architects and the community to consider:

- inclusivity, engagement, and interaction
- experimentation, innovation and knowledge creation
- adaptability, safety and sustainability.

Planning and decision-making requires educators, planners, architects and the community to consider:

- current educational philosophy and future projections
- expertise from multiple disciplines, students and the community
- systematic decision-making processes.

changing the culture of schooling

Home, school and community spaces, both virtual and physical are increasing in flexibility, with learning taking place beyond the boundaries of school buildings and the conventional school day. Students expect environments to be ICT rich, compatible and interconnected.

Students communicate and acquire information both within and outside their formal learning programs. Connecting more closely with communities enriches learning and reduces the effects of disaffection and remoteness.

Teaching and Learning

Curriculum is focused on understanding, rigour and relevance. ICT capabilities are integral to success in a connected, fast-moving, demanding world.

Conceptualisation and meta-cognition is accelerated and enriched using digital media for analysing, connecting, representing and creating knowledge.

Leadership

Transforming schooling is central to school and system leaders maximising the learning of every child, student and worker. New learning goals, pedagogies and worksites are required.

Maximising the possibilities accessible through contemporary technologies is changing learning, teaching and management practices in schools.

Best contemporary practice requires blended, synchronous and asynchronous delivery, connectivity, reliable systems, software and hardware, seamless access to content and services, and quality technical support. Schools require effective, continuously updated digital tools to manage planning, teaching, learning, assessment and reporting.

Strategic Decision-Making

Learning spaces shape and change practice: new designs and structures are critical to transforming schooling. Planning for virtual, face-to-face and blended learning is imperative when:

- designing new schools
- re-developing schools
- re-purposing buildings and learning spaces.

Architects and designers need to understand the changing educational requirements and apply this when planning spaces that:

- are future-orientated
- provide for rich ICT learning
- encourage new pedagogies
- connect to local and global communities
- support teachers and leaders
- are sustainable and adaptable.

ICT-rich learning spaces

learning spaces framework

Purpose

Adults and young people use digital technologies to communicate, interact and collaborate locally and globally. Using digital technologies blurs boundaries between learning and teaching, learners and teachers, formality and informality.

When fully incorporated in practice, ubiquitous, digital, mobile, interactive technologies improve and accelerate learning.

This is the purpose of ICT- rich spaces.

Improvement for all

Future societies and economies depend on the whole citizenry and workforce being digitally capable and innovative. Schooling must incorporate what students already use, recognising that current access to the digital world is not equally distributed in homes and communities. Schools have the responsibility to ensure every child's learning is ICT-rich.

This is a major driver of planning.

Innovative practice

Meeting community and workforce expectations requires professional practice to be continuously re-examined and updated for best use of digital technologies for teaching, learning and school improvement.

Learning spaces are expected to:

- accommodate current best practice, standards and opportunities
- encourage innovation
- adapt to possibilities beyond today's horizon.

This requires a planned strategy.

Continuous, holistic planning

19th and 20th century schools were built to provide, over many years, a shell for teaching and learning. 21st century schools, like other social institutions, are dynamic, continuously improving with advancing knowledge, practice and outcomes.

For 21st century school communities learning spaces become an organic part of schooling delivery, to be planned, along with staffing and other resources, with an eye to the future. As learning spaces and their infrastructure are expensive to build, fit and refit, school planning must incorporate technological trends and possibilities as well as changing demographics and educational knowledge advances.

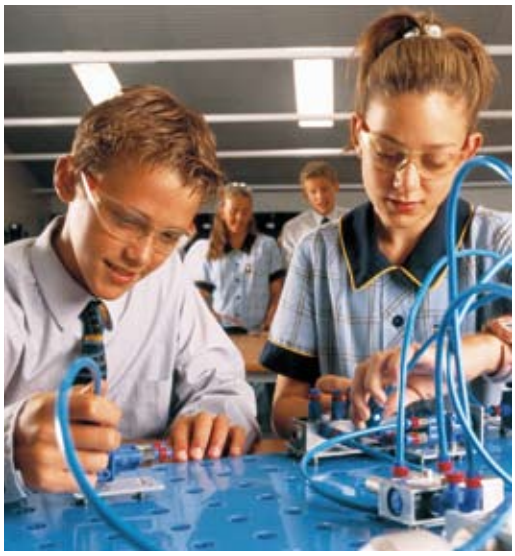
The expectation of continually improving delivery requires holistic planning.

ICT-rich learning spaces

Considerations

To achieve their learning potential, ICT-rich learning spaces need to be commissioned giving detailed consideration to:

- current and emerging education and technology trends
- the ICT richness of students' homes and the local community
- leadership and professional learning
- continuous, sustainable improvement
- school responsibility for support.



ICT investment in leading schools is directed to improving student outcomes through the targeted use of connected digital devices and resources, interactive technologies, and management and security technologies. It is the role of educators to predict and evaluate the learning impact of current and emerging technologies to determine the best use of ICT in their context. This requires working through practical issues and questions with designers and technical experts.

ICT-rich learning spaces

Connecting digital devices, resources and systems

Effective connections are dependent on both educators and the community articulating the learning objectives they want to achieve and coming to understand, for now and the likely future:

- options for students and teachers to connect to digital devices, the internet and the school network
- possibilities for high speed connectivity:
  - between home, school and the community
  - between school buildings
  - within school buildings
  - to fixed digital devices
  - to mobile devices
- the sustainable range, provision and configurations for fixed and mobile devices
- issues and benefits of connecting staff and student personal digital devices to the school network.

Students and staff need quick, reliable, access within and beyond the school to:

- dynamic content, rich, multi-media resources and curriculum materials
- systems and services
- personalised learning spaces
- virtual, collaborative spaces
- online teaching and learning environments.

Schools need collaborative online spaces to provide information and engage parents more closely with the school and their child's learning.

Access to the school network needs to be managed. Security and privacy are important considerations.

ICT-rich learning spaces

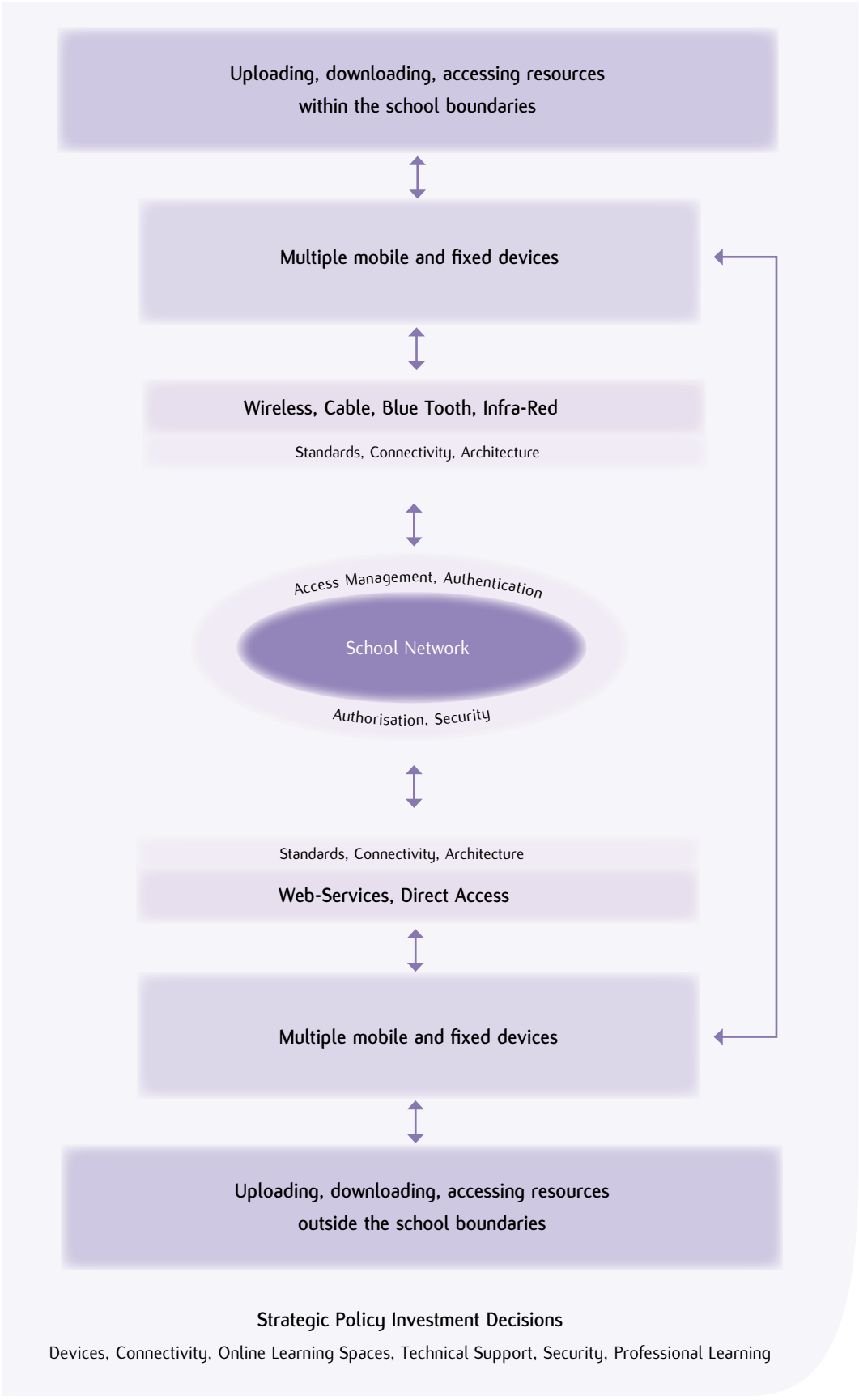


Figure 3: Connecting Devices, Resources and Systems

ICT-rich learning spaces

Digital devices and systems

desktop PCs	- LCD and plasma monitors
tablet PCs	- data-projectors and screens
laptops	- interactive whiteboards
smart phones	- high-end video-conferencing equipment
PDAs	- high-speed printers
ultra mobile PCs	- digital copiers and scanners
smart pens	- production and reproduction of CDs and DVDs
MP3 players	- learning and content management
digital and video cameras	- online enrolment, purchasing and management systems, booking
digital sound recorders	- control airflow, track energy use and security surveillance systems
video-conferencing camera	- radio frequency identification technology (RFID)
digital data loggers	- smart cards
digital microscopes	
global positioning system devices	
virtual reality simulators	
games consoles	

Figure 4: Digital Devices and Systems

Given that, now and in the future, teachers, students and administrators will use a continually changing range of devices, schools need to consider that:

- the convergence of easy and fast internet access with ever-smaller and powerful wireless computing devices increases the options for learning and accessing information
- digital devices can be used to support learning teams to work in different spaces in and outside the school at different times of the day and provide just-in-time access to information to support personalised learning
- students, staff and parents already use digital devices to communicate
- changing patterns of use will need to be incorporated
- some emerging trends in mobile technology will need to be accommodated.

ICT-rich learning spaces

Resources

Schooling has long been resource-intensive, with sophisticated resource-centres supporting pedagogies and learning programs. Digital media can accelerate learning, motivate, engage and assist the transition of young people into work and full citizenship. Searching, accessing, connecting, and aggregating technologies are advancing rapidly and have many applications in schooling.

Teachers, students and parents need continuous, quick and easy access to reliable, quality copyright-cleared digital content that is directly relevant to the curriculum. Much of this will come through The Le@rning Federation and jurisdiction initiatives, but digital resources, like all other resources, require focused planning, management and intelligent leadership to realise their potential.

Contemporary best practice assumes:

- students and teachers can and do legally and continuously access:
  - suitable digital content
  - extensive data-sets
  - tools to manipulate, analyse, modify, create and connect data
  - tools to adapt and create content
  - tools to search, evaluate, store and revisit content
- teachers, parents and students share information and resources in real time on a continuing basis, inside and outside traditional school hours
- schools understand and manage:
  - education-related data access, transfer and use in standard formats, within copyright licences, privacy law and security policies
  - evidence-based decisions, evaluation and improvement
  - continuous flows of information and knowledge within the school servers and outside the school.

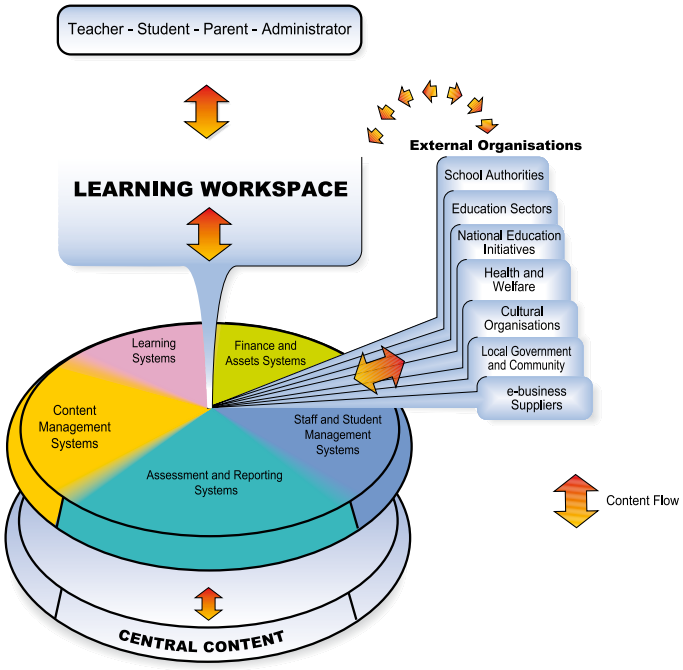


Figure 5: Overview of Content Flow

Interactivity

Technologies that enable students to work in teams with peers, teachers, and community experts and support powerful education networks and learning communities are required. Students and teachers need access to a range of technologies that support interactive learning in different spaces in and outside the school, at different times of the day and that provide just-in-time access to information.

Significant, rapid advance in the capability and affordability of interactive technologies provides innovative possibilities for learning and raises important policy and operational issues to be considered in the design of learning spaces.

Management and security

Management and security technologies are readily available and becoming ubiquitous in more schools. Policies of opening schools to the community and providing learners with access to highly portable ICT will necessitate the embedding of management and security technologies as a key consideration in the design of learning spaces.

An authenticated virtual space was established for Western Australian curriculum staff to contribute to the writing of the *Learning spaces framework*. Wireless access to a wiki, discussion forum, news tool and digital resources enabled effective sharing of information, co-construction of knowledge, collaborative writing and efficient communication. A literature review drawing on the last eight years of research into learning spaces, with relevant articles, was made available through the wiki.

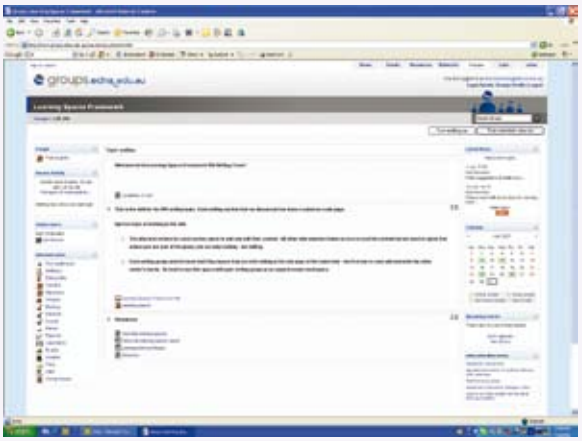


Figure 6: Virtual Learning Space

ICT-rich learning spaces

Social network technologies

Web 2.0 is changing the way students network, collaborate and learn. Social technologies continue to develop at rapid speed, permeating daily life. These present opportunities and challenges for 21st century schooling and the design of learning spaces.

- extend learning across geographically disparate locations
- produce, create and publish
- upload and share content
- collaborate with local and global audiences
- solve problems online

Technologies include podcasts, blogs, wikis, RSS, online spaces, student devices.

Virtual conferencing technologies

Significant changes are occurring in the use of conferencing technologies to deliver education and professional learning programs. Seamless integration of conferencing tools in general learning spaces and requirements for dedicated specialist facilities are important planning considerations.

- extend learning across geographically disparate locations
- access real time or on-demand audio, video and multimedia from computers or internet-enabled portable devices
- leverage staff expertise across multiple locations

Technologies include video, audio and web conferencing, web casting, broadcasting, vodcasting.

Interactive projection technologies

Image-projection technologies are important in the design of interactive learning spaces. Optimum placement of LCD screens and data projectors is essential to creating an environment for collaborative and explorative learning.

- present to group and large audiences
- collaborate using the Internet, word processing and spreadsheets
- project, sound and movie files and multi-media objects from computers
- engage in peer-assessment

Technologies include digital projectors, interactive whiteboards, touch screens.

Management and security technologies

New and emerging technologies improve communication, create learning and management efficiencies and increase security. Understanding the potential of the technologies is crucial to policy decisions, design of infrastructure and planning short and long term investment.

- link electronic devices
- display events and timetables
- message students, staff and families
- book spaces and resources online
- manage movement and activity
- provide entry, exit and learning space and facility security

Technologies include video-monitoring, plasma screens, electronic key, RFID, SMS, smart card.

designing spaces for learning

Until recently, the focus of school design has been on durability and longevity. It was common to focus on specific purpose buildings for defined time periods. Rapid change to education practice and technologies is requiring educators to constantly rethink the suitability of the space and its design - the value of the space against the needs of learners. The balance between the life of the building and better design is an important consideration.

Ongoing research with industry is needed to clarify the needs of educational spaces, to build a knowledge base of best practice and to inform the market of requirements. This is a new area of responsibility for educators and the answers are not all there. Educators need to shape the requirements.

Compliance

Schools are required to meet government legislation for public and education facilities. Each state and territory provides building regulatory legislation to give legal effect to the Building Code of Australia.

Standards

Nationally consistent codes, standards, requirements and systems have been created to meet expectations for:

- access
- health and safety
- amenity in the design, construction and use of buildings, furniture and fittings
- infrastructure
- environmental efficiencies.

Some are adopted by national, state and territory governments as requirements that must be met in the design of all public spaces. Others are recommended but remain voluntary.

Expectations

Governments and communities also have expectations that need to be taken into account when designing learning spaces. Some common expectations relate to:

- sustainability
- energy and water efficiencies
- waste reduction and recycling
- carbon footprint reduction .

Technology

Important considerations in learning space design include the:

- capacity of technologies to help meet compliance and to make the spaces more efficient and effective
- impact of the technologies themselves.

designing spaces for learning

Design considers learning physiology

Welcoming, stimulating learning spaces	• comfortable, imaginative and fun • maximum use of natural light and ventilation • creative colours, textures, patterns • range of formal and informal furniture and fittings • social spaces, range of technologies
Acoustics and lighting complement learning	• sound-absorbing materials on floors, walls and ceilings • full-spectrum lighting for general learning spaces • specialised lighting and sound (eg visual arts, performing arts, library, reading areas, social areas) • pre-programmed, remote and personal control • adjustable mood lighting

Learning is not fixed by time or place

Furniture can be re-configured for multiple users and use	• fit for purpose furniture • adjustable, modular and mobile • stackable and collapsible • ergonomic tables and chairs
Technologies support seamless movement between learning spaces	• wireless connectivity, docking stations • touch screens • interactive work surfaces linked to mobile devices • connected outdoor learning
Technologies support mixed ages, stages, abilities and learning needs	• tables suited to a range of technologies • flat screen monitors • notebooks and mobile computing devices • personalised lighting, sounds, pictures, videos
Staff and students can access secure storage	• customisable • authenticated (passwords, scanning, smart cards) • charging capacity

Learning spaces are sustainable

Continuous replacement, upgrade and renewal of ICT	• *life, life cycle* and *total cost* of ICT understood and informs short and long-term planning • emerging technologies, systems and services trialled and integrated • recurrent funding allocated
Environmental, technological efficiencies are implemented	• programmed systems to monitor water and energy use and to manage water and energy efficient appliances • recycling toner cartridges, paper, hardware • recycling ICT-generated heat
Responsive to community needs and expectations	• local community use of the school facility • affordable access to online digital resources, services and storage • ICT systems connecting local and global communities • getting the most public benefit from available resources

Quality Design

Strong educational leadership, clear pedagogical vision, designers understanding contemporary education requirements, and partnerships between the school, its community and the private sector are essential to achieving quality design. Multi-disciplinary teams need shared language and understanding to ensure the design brief demonstrates the best educational understanding, design quality, cost-effectiveness and ability to deliver to meet learner needs as they progress through each phase of development.

Processes need to be established to ensure appropriate consultation with teachers, students, principals, administrators, the community, facility managers, ICT managers, designers, architects and contractors through the cycle of decision-making.

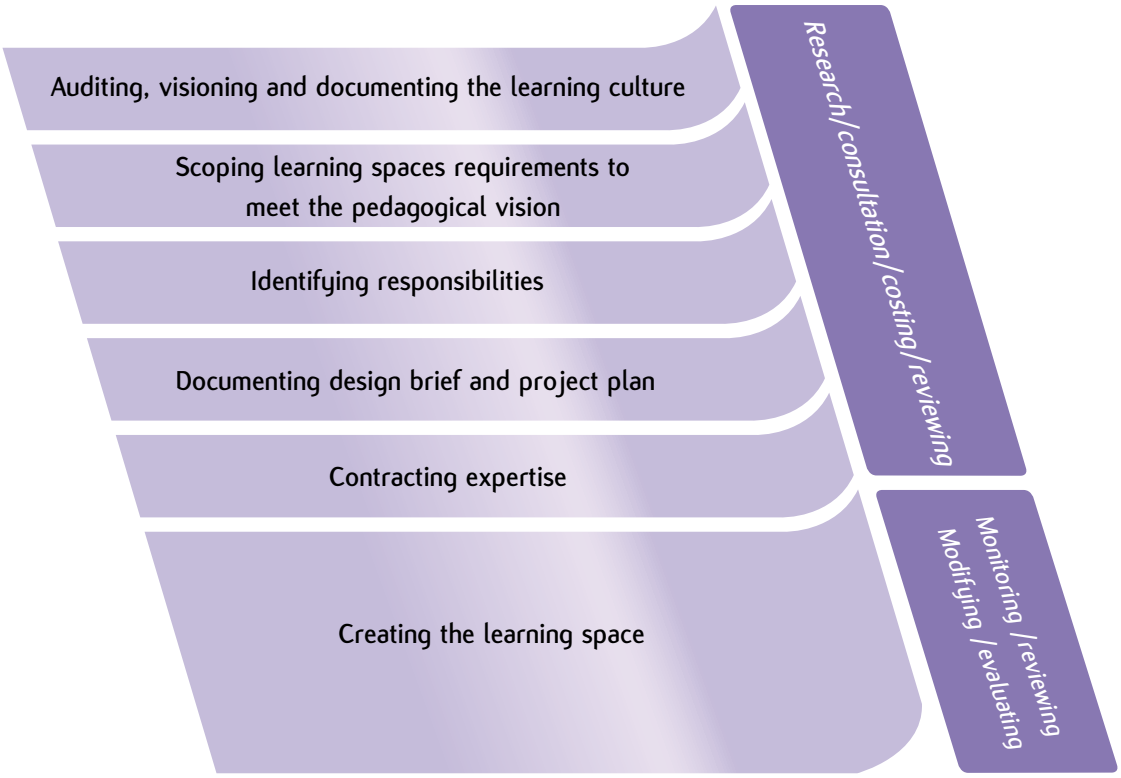


Figure 7: Decision Making

Quality design requires rigorous consideration of current research at each point of decision-making. Developing processes for schools and jurisdictions to share research with educators, industry and design professionals will support building a strong knowledge base from which educators can shape the requirements for ICT rich learning spaces.

designing spaces for learning

Useful Sites

Becta: Improving Learning Through Technology: *http://www.becta.org*

Building Schools for the Future: *http://www.bsf.gov.uk/index.html*

Commission for Architecture and the Built Environment: *www.cabe.org.uk*

Consortium for School Networking (CoSN): *http://www.cosn.org*

Council of Educational Facility Planners International (CEFPI): *http://www.cefpi.org*

Design Share: Designing the Future of Learning: *http://designshare.com/index.php/home*

Educause – Transforming education through Information Technologies:
http://www.educause.edu/content.asp?PAGE_ID=10569&bhcp=1

Futurelab: Innovation in education: *http://www.futurelab.org.uk/*

International Society for Technology in Education (ISTE): *http://www.iste.org*

International Technology Educators Association: *http://www.iteaconnect.org/Publications/ttt.htm*

JISC – Planning and Designing Good Learning Spaces:
http://www.jiscinfonet.ac.uk/infokits/learning-space-design

MCEETYA ICT in Schools Taskforce: *http://www.icttaskforce.edna.edu.au/icttaskforce/go*

National Clearing House: *www.edfacilities.org*

OECD Learning Directorate for Education PEB Exchange - the Journal of the Program of Educational Buildings: *www.oecd.org/edu/facilities/journal*

State and Territory Education Department Facility Guidelines

planning and decision-making

The following checklist raises some of the key ICT issues to be considered in the planning, design and construction of learning spaces when building new schools, engaging in major redevelopment projects, or when refurbishing or repurposing existing learning spaces.

Changing the Culture of Schooling

• articulate a shared vision for ICT in teaching, learning and administration	
• identify how ICT will be used and adapted to differentiate the curriculum to enable, extend and personalise learning for individuals and groups	
• seamlessly integrate ICT in all learning spaces to enable deep and powerful learning across all curriculum areas, pedagogy and assessment	
• provide for synchronous and asynchronous learning beyond the school boundaries	
• connect students, teachers, families and the community as local and global learning communities	
• use ICT to increase parent engagement and to provide relevant information, data and resources that enable families to contribute to their child's learning	
• plan for ongoing investment in professional learning with and about ICT for staff and the school learning community	

ICT-Rich Learning Spaces

• consider current and emerging education and technology trends, the ICT richness of students' homes and the local community and sustainability	
• provide an integrated, efficient system of connected digital devices and learning spaces appropriate to the full range of teaching, learning and administrative requirements	
• ensure efficient local and remote access to relevant curriculum, assessment and administration resources	
• provide systems and infrastructure that support and sustain access to, use and repurposing of rich digital teaching and learning resources	
• embed social networking, virtual conferencing, projection and presentation technologies to extend and enhance communication, collaboration and learning	
• use ICT across the school to improve the quality and timeliness of business	

planning and decision-making

ICT-Rich Learning Spaces

• use new technologies to improve management and security	
• embed an enterprise solution that, delivers efficiency, improves accessibility, reduces duplication and improves system interoperability	
• design for flexible electricity infrastructure, secure wireless access, scaleable bandwidth solutions, network management equipment and secure storage	
• plan for identity management and security	
• procure ICT resources to meet the current and future needs of the school as defined by the ICT strategy, planning for longer term issues of sustainability including the allocation of sufficient recurrent funding	
• plan for technical support, managed by technical staff, to minimise disruption to learning, teaching and administration	

Designing Spaces for Learning

• provide strong educational leadership and a clear pedagogical vision	
• engage with and undertake research to clarify the needs of educational spaces, possibilities and best practice in providing ICT-rich learning spaces	
• develop multi-disciplinary teams with shared language and understanding to ensure the design brief demonstrates the best educational understanding, design quality, cost-effectiveness and ability to deliver to meet learner needs	
• provide for appropriate consultation through the cycle of decision-making	
• ensure learning space design and construction conforms to legislation, endorsed standards, government and community expectations	
• examine how the use of technologies in space design considers learner physiology	
• use furniture, technologies and storage that supports learning not fixed by time or space	
• plan for continuous, sustainable ICT renewal, upgrade and replacement, upgrade and renewal of networks, devices, systems, services and software	
• implement environmental technological efficiencies	
• respond to community needs and expectations	

Figure 8: Checklist

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Further information regarding this publication

can be obtained from:

icttaskforce@mceetya.edu.au

80202