

ICT Leadership in School Education

by

Mark Gronow

A paper presented to the Australian Catholic University Conference  
“Directions for Catholic Education Leadership in the 21<sup>st</sup> Century”

29 July – 1 August 2007

The Sofitel Wentworth

Sydney, Australia

Educational reforms have addressed the technological needs of the 21<sup>st</sup> century learners (Beare, 2003). This group, referred to as Millennials or Net-geners (Baron & Maier, 2005), require learning conditions that are different to previous generations. Doherty (2005) claims that: *“Teenagers today are so influenced by technology that they learn differently from their parents.”* They are digitally literate and socially aware, they prefer group work, are achievement orientated, have short attention spans, are experiential, visual and kinaesthetic in their learning (Baron & Maier). McMahon & Psopisil (2005) describe them as having an information mindset with a focus on immediacy. Their world exists in information technology and digital media, they communicate via SMS, mobile phones, chat rooms and email. The millennial is able to simultaneously play computer games, watch TV and listen to music. They have developed the ability to multi-task, moving from one activity to another with minimum readjustment.

This new generation of learners have grown up with technology and are competent in a technological world. As their education requirements are different, old notions of teaching and learning are not applicable, the traditional “chalk and talk” approach of teaching and learning will leave the millennial bored and dissatisfied with their educational experience. Classroom teachers need to review their pedagogical practices to accommodate the new learner and aim to develop systems and structures that excite, engage and motivate the 21<sup>st</sup> century learner. To promote lifelong learners for the 21<sup>st</sup> century, schools need to use technology to accommodate new learning styles. Leaders in schools are challenged by the integrating of technology into education. This paper will review the issues faced by school leaders to effectively implement technology to satisfy these learners.

School organisation through Information and Communication Technology (ICT) and its use in teaching and learning is a requirement of educational institutions initiated by governments at state and federal level (MCEETYA, 2000, NSW BOS, 2004). School leaders, particularly principals, need to be aware of government expectations. *“All schools will seek to integrate information and communication technologies into their operations to improve student learning, to offer flexible learning opportunities and to improve the efficiency of their business practices”* (MCEETYA).

Implementing ICT into schools is the responsibility of the school principal, they need to ensure that the best interests of the students are served through effective ICT infrastructure and staff professional development. The principal is responsible that the investment, financial and otherwise, of ICT in the school is beneficial to the whole community. The introduction of ICT over the last twenty years has meant a reassessment of how schools function as a learning community, from teaching and learning to business and administration. The principal’s knowledge of ICT is essential so that systems can be in place to make organisational processes more efficient (Gurr, 2000), including the employment of personnel to manage and administer the ICT infrastructure. Above all the requirements of ICT for

administrative reasons, the principal needs to understand that ICT is an essential component in engaging students in learning, it is through the promotion of teachers' ICT use that effective pedagogy can be realised (Bishop 2002).

ICT resources of note book computers with accompanying software and technological hardware such as: interactive whiteboards, data projectors, digital cameras and scanners are now a part of a teacher's professional "tool box". Teachers are not only expected to teach using ICT, but to improve student ICT competencies as well. All NSW K – 10 syllabus documents have embedded ICT skills (NSW BOS, 2004), which are consequently examined in the CST10 (Year 10 Computing Skills Test).

Schools already engage ICT for organisational management. The new focus should be encouraging teachers' use of ICT by acknowledging and actively promoting ICT as integral to the teaching and learning process. Principals should be supporting teachers to engage their students through the use of new technologies such as web 2.0 (weblogs and wikis) or "social software" that is available as free downloads from the internet and the use of students' personal items like: ipods, mobile phones and PDAs. These are ICT learning tools that students are already using competently in the personal lives. Using these and other ICT is essential in a learning organisation and their effective pedagogical will increase student engagement and success in learning (Leach 2005, Carey 2005, Baron & Maier 2005, Kirkwood, 2005).

## **Learning Community**

ICT reforms are a new area of challenge for school leaders (Gurr, 2004). Effective school leadership is associated with successful adaptation of reforms, (Harris, 2003). Principals must acknowledge the pedagogical use of ICT in education and be prepared to lead these reforms. Harris identified leadership as influencing teachers' motivation and their willingness to adapt to change. The teachers are ongoing learners of ICT and consequently, as they accept and adjust ICT as an essential component of their work place they will improve their ICT understanding leading towards its pedagogical advantages.

The success of a school is in the principal's ability to effectively lead and develop change, to the creation of a learning community (Collarbone, 2003). A learning community has people working together with a common focus providing members with identity, belonging and involvement giving a sense of direction, order and meaning to the organisation (Sergiovanni, 2003, Hartle and Hobby, 2003).

As a learning community, schools are bound together by students, teachers and parents sharing ideas, values and beliefs (Sergiovanni, 2003). For a school this is ideally noted in the improved outcomes

for students. “A learning school puts pupils at the centre and connects up pupils, teachers, leaders, schools and communities” (Senge, as cited in Hartle and Hobby). The effective principal can create a learning community by developing a culture that supports and caters to risk taking, innovation and adaptation to change (Gurr, Drysdale and Mulford, 2006). There is recognition that learning is a continuous process and managing change is a permanent part of the principal’s role (Hartle and Hobby). Barth as cited in Collarbone (2003) suggest that to transform the culture of a school in a learning community then leaders themselves must become learners, innovators and risk takers.

## **Role Modelling**

Principals who are visionary and inspirational can develop the same qualities in others (Gurr, Drysdale and Mulford, 2006). The principal’s vision of the possibilities of ICT in teaching and learning are realised through supporting and developing the skills of others.

To perform the duties of a principal effectively, the principal’s own role is very much involved in using ICT. To realise their vision, principals need to be competent users of ICT, but as a learner of ICT, the principal’s personal ICT competencies and understanding may not be as sophisticated as their vision (Gurr, 2000). Bishop (2002) identified some principals are the least informed of ICT on the school staff, but Gurr (2000) says that the modern principal will have basic understanding ICT use fulfil their position competently.

The principal as a learner and user of ICT is a role model to the school community demonstrating the importance of ICT. An ICT role model for staff is essential in developing an ICT learning culture within a school (Cusack, Gurr and Schiller 1999, Day Harris and Hadfield 2001, Gurr, 2000, Gurr, Drysdale and Mulford, 2006, Hatley and Schiller 2003, Otto and Albion 2002, Schiller, 2002, Sweeney, 2005). Effective leaders are role models for others as Harris (cited in Hartle and Hobby) found, she said that the best leaders modelled their expectations of others by demonstrating high standards of professionalism.

While the principal is an effective role model to staff in ICT use and direction, it is not the principal who has to be the expert in ICT use (Haughey, 2006). The principal can rely upon other staff members to assist with ICT implementation and direction, it is reasonable for the principal to seek help when making informed decisions about ICT (Gurr 2000). Hatley and Schiller (2003) state there needs to be an ICT leader to support teachers, but this leader does not have to be the principal. Principals attempting to be ICT leaders who are not comfortable with their own ICT ability will be unable to secure effective ICT development in their organisation (Lee, Gaffney and Schiller 2001).

## **ICT Infrastructure**

The school with an ICT infrastructure allows for networked communities, promoting fast pace communication and information sharing. This allows for a less hierarchical and more flexible organisation, creating a new pattern of learning in schools. Principals, who recognise this, know it can make the school more efficient and transformative (Haughey, 2006). The distribution of power develops a learning school that encourages people at all levels to learn from their work, the organisation values learning so that it can transform itself through dealing with change (Dubrin, Dalglish and Miller, 2006).

The promotion of staff professional development in a learning organisation can be highlighted in an ICT rich environment where people learn from their work as a regular part of their day to day responsibilities. The principal who encourages personal responsibility for professional learning, by fostering and supporting professional development can create a working environment where staff feel valued and cared for (Gurr, Drysdale and Mulford, 2006).

The approach of supplying ICT resources before training is becoming a popular approach to integrating ICT into teaching and learning. More schools are increasing ICT infrastructure without professional development, such as installing interactive white boards in classrooms so teachers are encouraged to experiment in using them. Teachers learn to use ICT through regular and consistent use.

## **Distributive Leadership**

Gurr (2004) stated that individual centered leadership is no longer appropriate in an ICT rich environment. ICT leadership stems from a shared vision involving the support of the whole school community (Hately and Schiller, 2003). ICT allows others to have a greater influence as school leaders. A distributive view of leadership is emerging as a result of ICT integration in schools, further adding to the school leadership reforms. The principal's delegation of an ICT leader promotes the personal belief in the importance of ICT in the school. The ICT leader as the expert supplies the principal with advice on ICT. The principal, with the support of the ICT leader and school community, can develop an ICT vision and e-Learning plan, aimed at developing a sustainable direction for ICT in teaching and learning, administration and business of the school organisation.

The principal who delegates the responsibilities of leadership is able to create a learning community where everyone is given an opportunity to contribute to decision making, thus empowering people by allocating ownership to the shared vision. Dubrin, Dalglish and Miller (2006) describe delegation as a

major contribution to empowerment. The encouragement of others to lead fosters greater initiative and responsibility.

The task to become an effective leader is to develop leadership in others (Hartle and Hobby). Harris (2003) suggests that this redistribution of power within the organisation will create conditions where people work together and learn together, leading to a shared purpose and common goal. This notion of distributive leadership implies a different power relationship than what currently exists in many schools. The distinctions between leaders and followers may blur as the division of labour is widely dispersed, opening the potential for all teachers to be leaders. Shared decision making, distributed leadership and professional learning will motivate and empower others (Gurr, Drysdale and Mulford, 2006). This principal is able to set a goal for the development of ICT in the school by delegating the promotion and development to an ICT leader. The principal develops personally as a powerful leader by leading the reform, without necessarily being the expert. The ICT leader gains credit for the accomplishment, giving satisfaction and ownership to the direction and decision involved in the shared vision developed by the principal, in collaboration with the school community.

Lee, Gaffney and Schiller (2001) listed the qualities of an ICT leader as:

- Understanding quality education in a networked world.
- Understanding of ICT as it relates to teaching and learning.
- Valuing the effectiveness of integrating technical and human resources.
- Able to operating within a networked paradigm.
- Appreciative of the importance of knowledge management.
- An excellent net worker.
- Having high level analytical skills.
- Having good interpersonal and management skills.
- Able to oversee the work of other ICT staff.
- Able to lead the change management process.
- Able to provide education for all students in a digital world.
- Able to operate as an assistant or deputy principal.

## **Transformational Leadership**

The principal who can delegate responsibility and maintain a clear vision as described here is a transformational leader. This person has the ability to influence others by aligning the vision with the values of the organisation (Dubrin, Dalglish and Miller, 2006).

ICT implementation in schools embraces the successful principal as a transformational leader who can set goals, organise and monitor others and build relationships. This transformational leader is people centered and able to model values and practices consistent with ethos of the school (Day, 2003). Dubrin et al (2006) describe the transformational leader as having a vision for the organisation that is linked to the community's values. This is a shared vision that uplifts people's aspirations, creates excitement, provides a purpose for the community and enables people to work together. The ability to create and communicate this in the form of a meaningful vision is an important leadership characteristic (Dubrin, Dalglish and Miller, 2006).

The transformational leader raises the level of human conduct they are visionary, with a commitment to performance, values and standards (Day, Harris and Hadfield, 2001). The principal's vision sets the goals to be attained with the focus being on teaching and learning (Otto and Albion, 2002). Sweeney (2005) described the qualities of an effective leader as the ability to lead change, a clear vision and being ICT proficient. A vision with an ICT focus on teaching and learning can create enthusiasm within the community it puts the students at the centre of learning.

A clearly defined vision for ICT includes:

- Planning, funding and implementation;
- Improving access and equity of use;
- Understanding of legal and ethical issues;
- Awareness of learning theory, pedagogy and curriculum development.

(Hately and Schiller, 2003)

Principals, in developing a vision, are supported by government initiatives. Learning in online world (MCEETYA, 2001) sets students' success in ICT use as a target goal for schools. *"All students will leave school as confident, creative and productive users of new technologies, particularly information and communication technologies and understand the impact of those technologies on society"*.

All schools will seek to integrate ICT into their operations to improve students' learning, offering flexible learning opportunities and improving business practices. These goals identify that it is not only the students who need to be ICT competent, but the whole community.

The essential aspect of being the principal of the school as the dominant leader is about commitment to set a vision, to share and work with others in bringing the vision to fruition. ICT in schools is emerging as a central factor for schools to operate efficiently as organisations and as a teaching and

learning tool for teachers and students. The principal able to create a vision for the development of an ICT learning community will be a 21<sup>st</sup> leader and learner.

## **Case Study: St Augustine's College – Sydney**

St Augustine's is a 5 – 12 Independent Catholic Boys School located at Brookvale on Sydney's Northern Beaches. St Augustine's was founded by the Augustinian Fathers in 1956 under the invitation of Cardinal Gilroy. The Augustinians were to take over the parish of Brookvale on the condition that the Order would develop and staff a boys' College. The first official day of operation had 65 students in two classes, one Grade 4 and one Grade 5.

A new principal in 2002 saw the beginnings of a change in the culture and climate of the school. An energised vision and plan for the future was articulated by the new principal with ICT an integral part of that plan. The development of the College's ICT infrastructure and employment of key experts to take the College into the 21<sup>st</sup> Century as a leading ICT school was supported by the College Board, staff and parents. The principal's articulated vision of where he planned to take the College over the next 5 years saw an immediate response from the community and St Augustine's became a sort after school for boys on the Northern Beaches. In 2007, St Augustine's College is a leading school in ICT development.

### **History of ICT development**

2002 began the roll out of laptop computers for all staff members. In 2007 all teaching staff have been issued with a personal wireless capable laptop computer less than 3 years old. The computer network offers the complete Microsoft Office software for staff and has a variety of software installed including general access to the school timetable system, school intranet portal and the school administration database.

In 2007, St Augustine's has 948 students enrolled from Year 5 to Year 12. The school has increased in size significantly over the last 4 years. Two large building projects in 2003 and 2005, have enabled the school to become equipped with the latest technology infrastructures. Including optical fibre cabling and wireless network connection (see Figure One).

The first building project was the Brimson Centre to include a multi purpose hall and library. The library known as the ARC (Augustinian Resource Centre) was designed with a designated area for housing and maintaining the College computer network. The ARC also comprises of two designated computer areas with stand alone computers in an open plan learning environment.

The Lecceto Arts Centre, opened in 2006 includes two Apple computers laboratories (Mac Labs) with data projectors and drop down screens installed in the two labs and classrooms.

In 2007, the College has 5 computer laboratories and 80 student laptop computers on trolleys for movement between classrooms. Seven interactive whiteboard and data projectors are to be installed in classrooms.

## **Mission Statement**

The 2005 – 2010 College Mission Statement identified Technology in Learning as a priority. Setting its aims as:

- Develop and implement a policy and diverse program for the integration of Information and Communications Technology into all subjects so as to improve students' technology competencies and enhance their learning outcomes.
- Provide professional development which enhances teachers' confidence and competencies in the use of a variety of technologies as an aid to outcomes-based multi-activity classroom teaching practices.
- Develop shared understanding with students and parents about the ethical uses of technologies in students' learning.
- Broaden the range and variety of technology resources in Religious Education and the Key Learning areas so as to increase students' access to technology-based learning experiences and become an available tool to students with additional needs.

**St Augustine's College Sydney, 2005, Mission Statement and Strategic Plan 2005 – 2010 (pp 11)**

## **ICT Committee**

The ICT committee was established in 2004 gave ownership of ICT development throughout the College. Members of the ICT committee are:

- Administration Coordinator
- Assistant Principal - Administration
- Database Coordinator
- Director of Studies (Chair)
- Director of Teaching and Learning (Middle School)
- Director of Teaching and Learning (Senior School)
- Information and Communication Coordinator (Librarian)
- IT Manager
- Learning Technologies Coordinator

- TAS Coordinator

The ICT committee developed the College's ICT vision in its eLearning plan.

*“St Augustine’s College aims to provide students with a safe, supportive and caring environment – where all students are encouraged to reach their full potential through the desire for lifelong learning in accord with gospel values.*

*St Augustine’s College envisages an environment where the use of information and communication technology (ICT) is regarded as an integral part of our everyday practices in regard to:*

- *Students in their learning – both individually and in groups.*
- *Teaching staff in their research, communication and delivery of information.*
- *Administrative staff in their communication, financial and managerial functions.*

*The College will continue to provide opportunities for staff to develop their knowledge and skills in the ICT area.*

*eLearning encourages students and staff to assume greater responsibility for their own learning, in forums that develop their:*

- *Skills to become active and independent learners*
- *Abilities to communicate, collaborate, plan, analyse and solve problems*
- *Skills to use new technologies, particularly ICT*

*eLearning enhances student learning through developing independent learning. The vision is that eLearning across all KLA would be empowering all staff and students to be proactive in their use of technology in teaching and learning.*

*The appropriate use of ICT develops our school’s high quality teaching and learning, administration and management. eLearning enhances student centred learning. We aim to maximise opportunities for learning in middle school through an integrated and negotiated curriculum and similarly, in the senior school provide opportunities for ICT to be integrated into the students’ learning.”*

**St Augustine's College – e-Learning plan 2007 – 2009 page 2**

Further, the ICT committee has promoted the development of:

- New School Administration Database

Review of administration databases and recommendation to the Principal of the preferred package.

The ICT committee planned the implementation plan of the PCSchool as the College’s new Administration Database.

- New Content Management System

The ICT committee reviewed a number of Content Management Systems and made recommendation to the Principal for the preferred package. The planned implementation and roll out is for 2007.

- Purchase of ICT resources.

The ICT committee also recommended to the principal the purchase and placement of laptop computers, Mac Labs, interactive white boards and data projectors.

- Networking and resource problems.

The ICT committee discusses issues and concerns brought to its attention and works towards maintaining a secure and efficient network of computers.

- Staff development and ICT support

The ICT committee discusses appropriate development of supporting staff in teaching and learning in an ICT rich environment.

## **Staff professional development**

Throughout the period 2002 – 2006, there has been an ongoing staff professional development opportunity, including small groups working with the Association of Independent Schools consultant and early morning sessions at the breakfast club and twilight (evening) meetings. All staff has committed to be involved in ongoing professional within the College.

## **Resources**

The purchase of software packages such as Macquarie Universities LAMS (Learning Activity Management System) ICDL (International Computer Drivers Licence), Scholaris (Content Management System) and PCSchool (Student Management System) have given staff opportunity to increase and develop their ICT skills.

## **Experts**

The appointment of an IT manager supported by two technical assistants has catered for the Colleges rapid growth in ICT. The support given to the teaching and administrative staff through the IT personnel has greatly improved efficiency in the network organisation and structure. The personal involvement of this group has meant staff and students have been able to find support and cooperative responses to their needs.

The Learning Technologies Coordinator appointed in 2006 has the role supporting teaching staff in the use of technology for pedagogical purposes as well as developing computing competencies in both staff and students. This role links the technical aspect of ICT to the teaching and learning needs of the

students and staff. The Learning Technologies coordinator will liaise directly with the IT manager to assist with further developing structures to assist and support staff in using ICT for teaching and learning purposes.

The figure below outlines the hard ware number and network set up of the College.

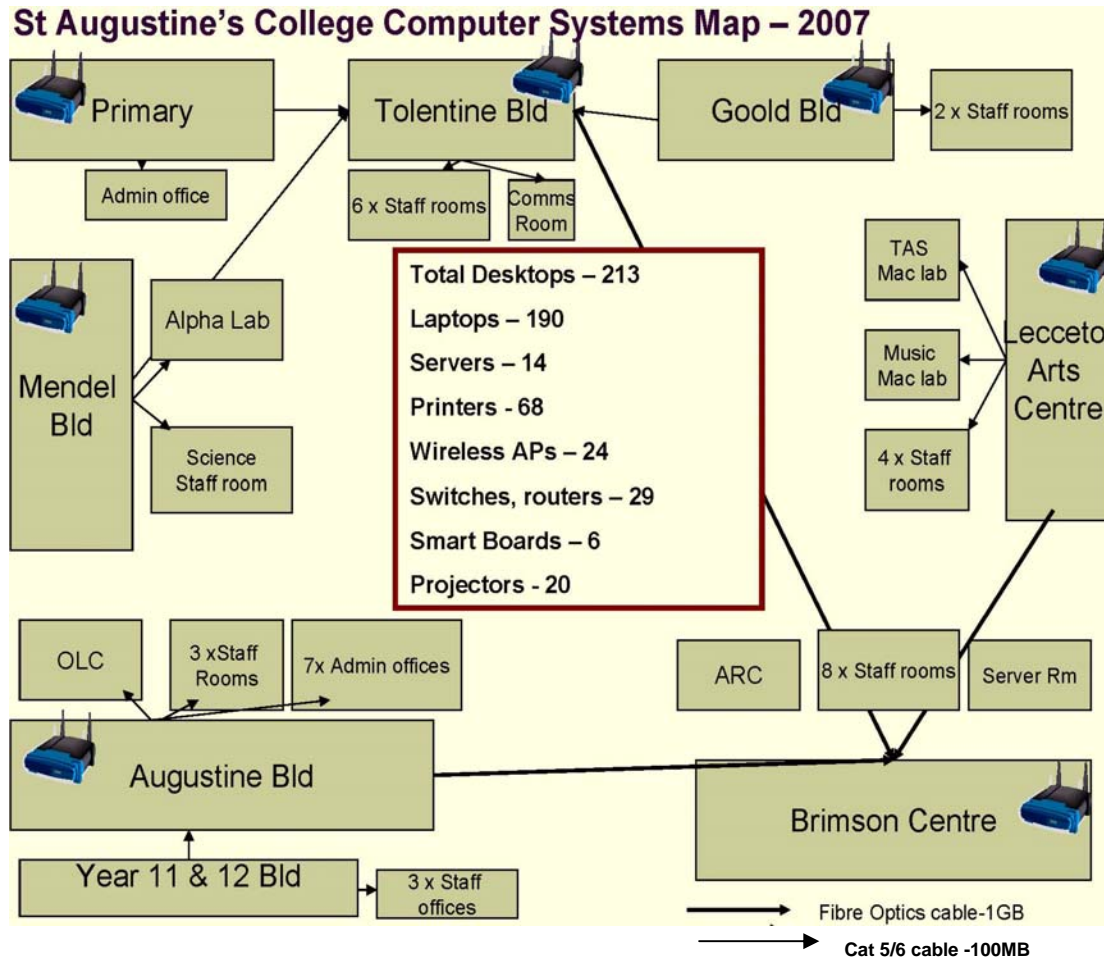


Figure One: St Augustine's College Computer Systems Map 2007

## References

- Baron, J and Maier, H. (2005). *The challenge of maintaining the momentum*. Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) Conference 22nd: 2005: Brisbane
- Beare, H. (2003). The school of the future. (pp 635 – 640) In Davies, B., & West-Burnham, J. (eds), *Handbook of Educational Leadership and Management*. Edinburgh Gate: Pearson Education Limited
- Bishop, P.F. (2002). *Information and Communication Technology and School Leaders*. Paper presented at the Seventh World Conference on Computers in Education, Copenhagen.
- Carey, P. (2005) From instructor to constructor *EQ Australia*, winter 2006, Curriculum Corporation.
- Collarbone, P (2003). Leading the learning community (pp 375 – 380). In Davies, B., & West-Burnham, J. (eds), *Handbook of Educational Leadership and Management*. Edinburgh Gate: Pearson Education Limited
- Cusack, B., Gurr, D. & Schiller, J (1999, July). The impact of technology on the work of educational leaders, *ACEL Hot Topic 1997 – 2003*, 227 – 240.
- Day, C. (2003). What successful leadership in schools looks like: implications for policy and practice. (pp 187 – 204) In Davies, B., & West-Burnham, J. (eds), *Handbook of Educational Leadership and Management*. Edinburgh Gate: Pearson Education Limited
- Day, C., Harris, A., & Hadfield, M. (2001). Challenging the orthodoxy of effective school leadership. *International Journal leadership in Education* 4(1) 39-56.
- Doherty, L. (2005, October 1). *Where worlds collide and pupils leave teachers behind*. Sydney Morning Herald from <http://www.smh.com.au/news/national/where-worlds-collide-and-pupils-leave-teachers-behind/2005/09/30/1127804662694.html>
- Dubrin, A.J., Dalglish, C. & Miller, P. (2006). *Leadership 2<sup>nd</sup> Asia-Pacific Edition*. Milton Queensland: John Wiley & sons Australia, Ltd.
- Gurr, D., Drysdale, L., & Mulford, B. (2006). Models of successful principal leadership. *School Leadership and Management*, 26(4) 371 – 395.
- Gurr, D., (2000). The impact of Information and Communication Technology on the Work of School Principals. *Leading & Managing* 6(1) 63 – 67.

- Gurr, D., (2004) ICT, Leadership in Education and E-Leadership. *Discourse: studies in the cultural politics of education*. 25(1) 113 – 124.
- Harris, A. (2003). Teacher leadership: a new orthodoxy? (pp 44 – 50). In Davies, B., & West-Burnham, J. (eds), *Handbook of Educational Leadership and Management*. Edinburgh Gate: Pearson Education Limited
- Hartle, F. and Hobby, R. (2003). Leadership in a learning community; your job will never be the same again. (pp381 – 393) In Davies, B., & West-Burnham, J. (eds), *Handbook of Educational Leadership and Management*. Edinburgh Gate: Pearson Education Limited
- Hately, N., & Schiller, J., (2003) What personal ICT skills do school leaders need? *The Practicing Administrator*. 4 5 – 7.
- Haughey, M., (2006) The impact of computers on the work of the principal: changing discourses on talk, leadership and professionalism. *School Leadership and Management*. 26(1) 23 – 36.
- Killen, R. (2005) *Programming and Assessment for Quality Teaching and Learning*. Thomson Social Science Press Southbank Victoria.
- Kirkwood, A & Price, L (2005), *Learners and learning in the twenty-first century what do we know about students' attitudes towards and experiences of information and communication technologies that will help us design courses?* *Studies in Higher Education* Vol. 30, No 3, June 2005, pp 257 – 274.
- Leach, J. (2005) *Do new information and communication technologies have a role to play in achieving quality professional development for teachers in the global south?* *The curriculum Journal* Vol. 16, No 3, September 2005 pp 293 – 329.
- Lee, M., Gaffney, M. & Schiller, J. (2001). Integrating ICT in your school new opportunities for leadership. *ACEL Hot Topic 1997 – 2003*. 201 - 204
- MCEETYA (2000), *Learning in an online world: school education action plan for the information economy*. Adelaide: Education Network Australia.
- McMahon, M. & Pospisil, R (2005), *Laptops for a digital lifestyle: Millennial students and wireless mobile technologies*. Australasian Society for Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) Conference 22nd: 2005: Brisbane
- Mulford, B. (2005). Quality evidence about leadership of organizational and student learning in schools. *School Leadership and Management*. 25(4) 321 – 330.
- NSW Board of Studies (2004) from [http://www.boardofstudies.nsw.edu.au/syllabus\\_sc/mapping\\_information.html](http://www.boardofstudies.nsw.edu.au/syllabus_sc/mapping_information.html)

Otto, T.L. & Albion, P.R. (2002). *Principals' confidence toward teaching with ICT: A critical element in leading appropriate change*. Paper presented at Australian Computers in Education Conference, Hobart.

Schiller, J. (2002). Surfers or Spectators? Principals and ICT. *Principal Matters* March 30 - 31

Sergiovanni, T. (2003) A cognitive approach to leadership. (pp 16 – 24). In Davies, B., & West-Burnham, J. (eds), *Handbook of Educational Leadership and Management*. Edinburgh Gate: Pearson Education Limited

St Augustine's College Sydney, 2005, Mission Statement and Strategic Plan 2005 – 2010 (pp 11). [http://www.saintaug.nsw.edu.au/st\\_aug/main/pdf/mission\\_statement05\\_lores.pdf](http://www.saintaug.nsw.edu.au/st_aug/main/pdf/mission_statement05_lores.pdf)

St Augustine's College – eLearning plan 2007 – 2009 page 2

Sweeney, B. (2005). Management and Leadership in Schools. *Teacher* August 48 – 50

Tapscott, D. (1999) Educating the Net Generation Association of Supervision and Curriculum Development. *Educational Leadership*; 56(5) p6-11 Feb 1999

## **Figures**

Figure One: St Augustine's College Computer Systems Map 2007