Central to the debate surrounding classroom observation and research in technology rich Smart Classrooms on the Magill Education Precinct, are the following questions: What is the purpose/s of the Classroom? How do we envisage use of the technology rich Smart Classroom? Who will have access to the classrooms? How often will the classrooms be used and by what arrangement? How might we observe the participants in Smart Classrooms? With or without one-way mirror windows onto their worlds? Participant versus non-participant: that is rather than observe at a distance, couldn’t we just ‘experience’, as when researchers or student teachers choose to join mentors and children in the same classroom? How can a safe, supportive, collaborative, shared learning space be created? There are technological questions about the role of technology, both within the classroom setting as a teaching and learning tool and as a means of data collection.

Ethical concerns are important. Simply put, the ‘is’ of creative technical possibility and pedagogical opportunity is bounded by the ethical ‘ought’; and with this, a parallel set of ‘is’ and ‘ought’ questions follow with respect to research and observation. The conceptualisation of the technology rich Smart Classrooms requires a critical balance between cutting edge technology and pedagogy and ethical choices with the shared goal of researching and informing policy, teaching and learning practices and outcomes.

The answer to these questions will impact on the design brief of architects and technology providers.

Context
Recent policy changes and concerns about educational quality and equity, in relation to student achievement results has seen an increased focus on developing processes that can facilitate the collection, analyses, interpretation and application of school and systemic data. This has occurred alongside calls to improve the data literacy of teachers, all with a view to improving student learning experiences and outcomes. The Australian Teacher Education Ministerial Advisory Group’s Report (2014) specifically states that, ‘pre-service teachers must be equipped with the capacity to investigate what is, and is not, effective in their own practice’.

The availability of technologically informed pioneering (e.g. learning analytics using big data caches) and more traditional processes of data collection, aggregation and application collectively have the potential to provide comprehensive evidence to inform teaching practices and student learning outcomes. Whilst the art of teaching has ‘largely been considered a private affair’, classroom observation is becoming more common and increasingly is being recognised as an important aspect
of any system of teacher evaluation or appraisal. However, despite having a long history in teacher education, observation, particularly as an assessment of teacher competence, has/is not necessarily always embraced by in-service teacher professionals.

**Defining classroom observation and utilisation**

Classroom observation is commonly understood to be a ‘family of related procedures for gathering data during actual […] lessons or tutorial sessions, primarily by watching, listening, and recording (rather than by asking)’ (Nunan and Bailey 2009). Teachers draw on classroom observations of students to inform their teaching practice in order to align student learning needs with relevant pedagogy.

The way in which the classroom is conceptualised will impact on the way it is promoted/marketed and utilised. The language program in the lab classroom at the Portland State University highlighted the need for students to feel that participating in the lab program was just like attending any other class on the site. The use of the lab classroom in this way, meant that students were attending classes in the lab classroom over longer periods of time. This approach speaks to the validity of data collected and is an important consideration for the intended use of the Smart classroom in the Magill Education Precinct.

As such, the design and utilisation of the Smart Classrooms in the Magill Education Precinct could be considered both:

1. At the macro level, that is, will the education community/intended users of the Smart Classrooms use them for one off sessions, multiple sessions spaced throughout the school year or for blocks of more intense study periods, or a combination of all options? And,
2. At the micro level what type of observation methods need to be accommodated? How can facilities enable both technology and traditional methods of observation to be incorporated so that different users and approaches to observation can be catered for? For example, in instances of non-participant method, observation occurs from a distance and there is no interaction between participant and observer, whilst in participant methods, researchers engage with the group being observed.

Therefore, it is important that the design supports multipurpose engagement across a range of curriculum areas. It will ensure social inclusion and match the special needs of different user groups, as well permitting a varied set data collection methods.

**Ethics and data rich learning environments**

Research shows that, more often than not, teachers are largely unaware of the evaluative or control criteria against which they are evaluated. Related to this, observers do not know always what to look for or are forced to rely solely on their subjective lens. When such a situation prevails, teachers’ see observation primarily as a source of control exposing their vulnerability and not as a tool for professional development to address gaps and improve teaching skills.

In line with the National Statement on Ethical Conduct in Human Research (2007) and UniSA’s commitment to producing ‘dynamic and socially-conscious educators of the future’, there are important ethical, cultural, methodological and resource considerations that need to be addressed when designing data rich community spaces:

- Disclosed method of observation minimises ethical issues related to consent and privacy, as participants are aware they are being observed. This can, however, impact on validity of the data.
• Undisclosed method increases validity but introduces ethical concerns regarding participant informed consent and privacy.
• Navigating ethical concerns also has implications for cultural sensitivity as technology is used to intrinsically motivate education and research and as a medium of invention and construction.

The Lab Classroom Model in the USA
The Lab Classroom Model, also known as the Demonstration Classroom model, in Brockport Central School District in New York State highlights the need for specific learning focus, administrative and technical support and established protocols for participants who engage with observation methods of data collection.

The lab classroom draws heavily on observation methods and allows for several sessions/visits throughout the year for groups, and thus facilitates instructional consistency and enables the integration of professional learning to transform professional practice. This model provides opportunities for multiple waves of data collection and longitudinal studies.

The ESOL Lab School at Portland State University supports a variety of data collection methods and research designs, including digital audio and video recording, longitudinal studies to follow individual long-term learning outcomes of students, and experimental research design.

The Smart Technology Rich Classrooms will create open learning environments that transcend off and online spaces, enabling multichannel avenues for students to engage, communicate and interact. In addition to providing an innovative learning setting, Smart Classrooms have the potential to bring together mutually valid technology enhanced methods for collecting, storing, engaging and applying data and traditional methods such as direct observation. Incorporating design features in Smart Classrooms, such as one way mirrors, film equipment also can provide additional opportunities to simultaneously, and in connected ways, collect observation data on student engagement, learning and teaching practice. Rigorous triangulation has the potential to provide detailed evidence based insights into the art and science of teaching and learning.

The One-way Mirror Teaching Model
With the use of mirrors, a new teaching model has been proposed (Education-World 2016). Suggestions about criteria that can help to achieve successful, effective adoption of mirrors in teaching practice include, being clear about what it is that teachers want to, and can, learn from the facility, and developing a strong workshop model. It is also important to establish clear procedures such as using pre-observation meetings and debriefing sessions.

The use of mirrors in classroom observation can be isolating for the observed teacher, who is absent from the all important discourse and is seen more as an object to be analysed and evaluated. However, this can actually engender positive effects, since distance from the context may help reduce personal bias and give teachers a fresh perspective. Other benefits include the potential to capture a range of interactions, emotions, facial expressions, it further provides a wide view of the entire classroom setting:

The one-way mirrors give visiting teachers and researchers an "eye" into the classroom showcasing ‘classroom environment, the latest teaching methodology, and student interactions with the teacher’ and forms part of the district’s wider plan to improve instruction as well as student learning.

There is a strong perception that one-way mirrors accomplish unobtrusive, authentic observation of teaching and learning. In particular, teachers who are observed appreciate the
opportunity to get into other people’s classrooms and they also appreciate the networking opportunities with peers.

On the other hand, teachers’ abhor the feeling of being watched. The use of mirrors also reinforces the inspectorial role of classroom observation to check that teachers are performing to at least a minimum level of competence measured against the Standards. While some perceive this to be necessary in teacher’ education and teacher professional development, this can at the same time, squeeze out democratic, collaborative and alternative visions of what it means to be a teacher.

The complexity of using mirrors in classroom observation is captured in these voices: ‘the pressure to always be ’demo-quality’ on a daily basis is tough. But it keeps me at the top of my game and has pushed me tremendously. Obviously, this is a real classroom, and some days are better than others. As a teacher, I am putting myself out there, and I am doing the same to my students. Not everyone remembers that even demonstration teachers and students are subject to rainy days and the phases of the moon.’ (Education-World 2016).

The use of technology in classroom observation
With the availability of new technologies, classroom observation activities no longer have to rely solely on windows (mirrors) or direct experience. Alternative body-based observation formats exist including wearable audio recording devices (e.g. socio-metric badges) and wearable video devices (e.g. Go Pro equivalents). Technology provides tools to further achieve the objectives of classroom observation; whether for research, feedback to students/teachers or the generation of big data learning analytics. Recording mitigates subjectivity as observers are able to discuss observations together with the observed teachers.

Innovative advances in technology, are enabling interaction with all computation devices, seamlessly and collectively. Development is this field is captured in the research domain of Ambient Intelligence (AmI) which has been defined as ‘any space where ubiquitous technology helps the learning process in an unobtrusive manner’ (Aguilar, Valdiviezo, Cordero and Sañchez, 2015). The redesigning of classrooms where sensory technology, communication technology, augmented reality, mobile technologies, artificial intelligence, are considerations for state of the art Smart Classrooms. How these technologies can be embedded, integrated both as objects of research and enablers of research in the field of education and within the paradigm of improved teaching and learning outcomes and experiences is critical.
Recommendations

While there are serious considerations in observing someone else teach for the purpose of providing evaluation or corrective feedback on their teaching, classroom observation can have broader and much more supportive uses which are generally perceived to be beneficial. The same is true as regards observing students as they learn.

There are important design considerations with the use of mirrors, such as Acoustics and the need for air gaps to reduce noise transmission, the selection of glass, and tinting, silvering, thickness, safety of the observers and those being observed, privacy, security and lighting. Additionally, the option to incorporate a blocking blind can increase the flexibility of the classroom use.

The following recommendations are for consideration in the design of the Smart Classroom at Magill Educational Precinct:

- That the design and integration of observation facilities be positioned within forward looking accountability and a paradigm of improvement based upon evidence informed (formative) feedback on learning for participants.
- That Smart Classrooms and classroom observations provide an opportunity to: engage educators in dialogue about different teaching and learning styles; support individual and cooperative peer-reflection; provide valid methods of data collection that can inform education policy and practice.
- That the Smart Classroom incorporate flexible design that will enable multifunction use of the learning spaces by multiple users, including pre-service teachers; practitioners, students with special needs; curriculum writers across various arrangements (e.g. long term access to the classroom; multiple sessions across a period of study; repeat visits yearly).
- That the Smart Classroom incorporate flexible design that will support various approaches to data collection, including observation that draw on both innovative and more traditional methods, e.g. direct and filmed; self-report data and data analytics.
- That Innovative advances in technology, including: sensory technology; communication technology; augmented reality; mobile technologies; artificial intelligence which enable interaction across devices are incorporated in the design of the classrooms.
- That consideration be given to how technologies can be embedded, integrated both as objects of research and enablers of research in the field of education.
- That infrastructure, particularly technology infrastructure will support expansion of facilities in the future.
- That design features enable secure, reliable and valid methods of data collection, treatment, application and storage which support both quantitative, qualitative research design and methods.
- That design be contemporary and innovative, particularly in relation to lighting, sound and aesthetics.
- That a consultative process be employed with relevant education stakeholders in decisions related to aspects such as Smart Classroom design, use, and protocols of an ethical and culturally sensitive character. ¹ This will ensure that the safety and security of observers and those being observed is paramount.

¹ What clearances are required for working with children in this context? What consent process will be required? What will constitute informed consent once the teachers and students to be observed have signed off on an agreement that their actions and reasons for acting can be researched. What is the obligation to consult them again on future permissions? If there is such an obligation when and to what degree should it be re-negotiated?
For further information

Stephen.redillas@mymail.unisa.edu.au
Stephen.dobson@unisa.edu.au
Carmel.taddeo@unisa.edu.au

Further readings


The ethical question re-appears a) if a blanket ethical permission is to be avoided or, b) in the building and design process when ethical needs cannot easily be anticipated.