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Research Article

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Findings: Strand Two of the PhD Study "Emerging Forms of Learning, Future Skills"

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Abstract

This is a Summary Report of PhD research study Future Schooling and Futures Thinking: Emerging Forms of Learning, Future Skills Educational and Schools' Leaders Perspectives.

In strand two of the PhD research study, the researcher sought to identify the "forces of change," their impact, and the challenges they provide for the future of work and education as seen by Western Australian school leaders and teachers.

It also sought to explore how Western Australian schools are preparing their students for future environments and what learning and teaching may look like in schools of the future.

Keywords: Emerging Forms of Learning, Future Skills, Pedagogy, Well-Being, Personalised Learning, Teacher Meltdown, Artificial Intelligence, Emerging Technologies, Education, Learning and Teaching

1. Introduction

Strand two *The Emerging Forms of Learning, Future Skills* commenced November 2021. An invitation was sent to four Western Australian schools to participate. Three schools accepted. Principals of those schools invited members of their leadership team and educators to be involved. Follow up separate meetings with the participating school leaders and with the educators were held to discuss the research study and design process.

1.1. Participant Sample

The participating schools were recruited from Western Australian school leaders who had participated in an earlier strand of the research study entitled 'scenarios of future schooling, futures thinking'. Three of the four schools invited decided to participate. The three Western Australian schools were K-12 independent all-boys' schools in a high socioeconomic area of Perth. These three Western Australian schools are prestigious institutions with the ability to make the necessary changes to better meet the needs of students in the future. There were an equal number of female and male leaders and teachers, with ages ranging from 24 to 64.

School Leaders (n=10)

Of the three participating schools, ten school leaders from those schools accepted the invitation to participate. The schools were chosen using purposeful sampling. It is a sampling method used in the qualitative research approach for identifying and selecting information-rich situations to make the best use of limited resources [1]. The leaders were recruited by the principals of the participating schools. This is known as snowballing sampling. This type of sampling as previously discussed is a nonprobability sampling approach in which the current study participants recruit prospective study participants from their social setting.

School Teachers (n=10)

Of the three participating schools ten teachers accepted the invitation from there school principals. The teachers were also chosen by snowballing sampling. Snowball sampling is applied when samples with the target characteristics are not easily accessible [2]. The principals of the participating schools invited the teacher participants for that reason. They were invited by the principal based on interest, ability to contribute, potential professional learning and time commitment.

To obtain data saturation in qualitative investigations, it has previously been advised that a minimum sample size of 12 be used [3-6]. As a result, given the qualitative analysis and scope of this study, a sample size of 20 people was deemed sufficient.

The *Emerging Forms of Learning, Future Skills* strand attempts to ascertain what Western Australian school leaders and teachers consider important about learning and teaching into the future, what the 'forces of change', their implications and challenges for the future of work and education as perceived by them, what they believe learning and teaching will look like in the future, and how is their school preparing students for future environments.

The study commenced with a personal invitation to strand one participating educationalists in a school leadership position in the Western Australian school sector/systems.

1.2. Ethical Approval

As previously noted, the Study was granted Ethic Approval for both strands of the research study. The application was reviewed through the Curtin University "low risk" review process and the review outcome approved. The proposal met the requirements described in the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research [7].

1.3. Participant Information Sheets and Consent Forms

Consent forms were provided to all the participants of this strand. The form asked permission to be involved in the research study and created an agreement between the researcher and the research participant outlining the roles and responsibilities they are taking on during the research process. The researcher retained one copy of the consent form signed by both themselves and the participant. The participants were provided with numerous invitations, information and consent forms including:

1. Participant's letter of invitation
2. Information letter for school leaders and educators
3. Consent form template for school leaders and educators

2. Methodology and Research Methods

Strand two of the two-strand research study used an iterative mixed method approach and was guided by the principals of participatory action research methodology approach applied concurrently. Three schools volunteered to participate in strand two of this study. In the initial stage 10 school leaders from those schools completed two questionnaires. In stage two ten participating teachers completed two questionnaires.

The research data was complemented by demographic questionnaires and survey forms. The data was manually coded, summarised, and evaluated for emergent themes after each questionnaire and survey form. The questionnaire and survey forms used through the course of this strand are provided online using Office 365 Forms.

Once each questionnaire and survey form had been completed by each participant group the questionnaires and survey forms were analysed. Open coding was used to code all the data collected from the questionnaires and survey forms. Each open-ended qualitative questionnaire and survey form was coded and categorised using Qcamap software. The output of open coding was a list of identifying codes and categories that was attached to the text and accompanied by annotations that explained the meaning of the codes [8].

The researcher coded each batch and analysed it for categories or themes.

3. Data Collection Process

The *Emerging Forms of Learning, Future Skills* strand of the research study investigated how schools are preparing students for future environments. They were asked: 'are schools developing a school curriculum that focuses on the development of 21st century skills and knowledge to develop the learning capacity to solve problems and to find solutions to challenges as they arise'? The study also investigated the perceptions of the participants about this and sort to determine how 21st century skills and knowledge are positioned so that students will be enabled to manage their futures. This strand examined what Western Australian school educators believed to be the *'forces of change',* the implications and challenges of these for the future of work and education addressing the question, 'How might learning and teaching (that is to say, pedagogy) look in schools of the future?' School leaders were asked to consider the 'forces of change' model in terms of its implications and the challenges it presents for work and education, as documented in the *Framework for Understanding the Emerging Forms of Learning* (Appendix 1).

In stage one (cycle one) ten (10) school leaders participating in "*The Emerging Forms of Learning, Future Skills"* strand, were asked to complete one questionnaire and then another questionnaire with a set of questions to describe what they believed to be the top three issues concerning systems change that education faces today. Then, for each of those, they were asked what they believed to be the key resources needed to best address these issues. Subsequently they were asked to discuss what they could do if these resources were not available (Appendix 2).

In the stage two (cycle two), a group of 10 teachers from the same three schools were asked to verify the initial stage and add examples, criticism and additional solutions. As a participant in the research, they were asked to consider what learning and teaching (that is to say, pedagogy) might look like in schools of the future.

In completing the first questionnaire they were asked to refer to the *Framework for the Emerging Forms of Learning* that looks at the 'forces of change' its implications and challenges. The next questionnaire is based on the *Stages of Concern* model ((Appendices 3) [9]. The provided a Stages of Concern table that has been adapted from George, Hall, and Stiegelbauer [9]. The Stages of Concern method presents seven possible concerns about change or innovation. Using The questionnaire participants

will rate the extent to which they agree with various statements related to an innovation or system change. As educators become more innovative, their concerns will change and they will focus on impact; that is to say, they will focus on how the change or innovation will affect their students or working relationships with their colleagues. This questionnaire will include the questions, 'What level of concern do you have about how the forces of change documented above will impact your school in the near future?' to which you will be able to choose a level from 1 to 7. The school leaders and teachers will be asked to express their concern to the forces of change. The researcher and the participants can later analyse the data to inform future recommendations or the actions they take to support change.

The data will be examined at the school level to determine the types of concerns identified by the participants. The researcher may hold a brief, one-on-one conversations (interviews) with several the participants about their feelings, thoughts, and reactions to the innovations or system change. This approach will enable the researcher to gather more in-depth information about their concerns so that the researcher could make appropriate recommendations from the findings on how to address the concerns. The results of the data collection should indicate where staff members fall within the seven stages and provide a snapshot of their concerns so that the researcher can make appropriate recommendations from the findings on how to address the concerns.

Each School's data collection is confidential. Each school received only the data collected from their leadership team members and the teachers. The names of the schools will be kept confidential.

In Stage three (cycle 3 of the PAR process) follow-up actions by the school might include offering how-to provide support and coaching. This is part of the participatory action research cycle of ongoing planning, acting, and observing, and reflecting. The complexity of the Participatory Action Research for Strand two is shown in the Appendix 4. The key features in this figure included its spiraling cyclical process of change and there is in each of the three cycles a consideration of action and reflection in each cycle - there is the consideration or implementation of an action for the improvement of a practice, to a system change or innovation.

The consideration is based on the Stages of Concern Model and there is the use of data collection on the action, a review of the action through a consideration and a validation of the data [9].

3.1. Demographics of Strand Two Participants

Throughout strand two to maintain confidentiality, participants were be identified as either Leadership Participants or Teacher Participants. Members of the leadership team are called Leadership Participants and chosen teachers, Teacher Participants. There were 10 Leadership Participants in total from three schools who completed two online questionnaires in stage1/cycle 1. There were also 10 Teacher Participants who completed two questionnaires in stage 2/cycle 2 within those 3 schools. In the teachers second questionnaire - the Stages of Concern the participants were: school A with three Teacher Participants. In school B another 3 Teacher Participants and in School C there were 4 Teacher Participants. In total n=10 teachers within 3 schools.

3.2. Summary Points Highlighted by the Leadership and Teacher Participants

The Leadership and Teacher Participants responses in strand two highlighted several key messages. These are articulated in the following tables 1 and 2.

Leadership Participants Key Statements: Cycle 1	
❑ Leadership Participants saw a need for a whole child approach to learning, which focuses on the bigger picture … 'when a school takes the whole child approach, they recognise their responsibility to support the health and happiness of their students and not just their academic results'.	❑ Leadership Participants stated further skillset would be required for teachers as they shift from that of content delivery, feedback provider and assessor to that of facilitator, mentor, counsellor …
❑ Leadership Participants agreed there is an increasing movement in artificial Intelligence (AI) and data analytics, but there are no clear guidelines for the use for this technology.	❑ Leadership Participants agreed increasing movement to artificial Intelligence (AI) and data analytics, but there are no clear guidelines for the use for this technology.
❑ Leadership Participants saw the need to build staff and student resilience and their health and wellbeing.	❑ Leadership Participants believed content, feedback, assessment tools and personalised learning paths will be able to be generated and monitored without the need for an actual teacher being present, and students will be able to learn at their own pace, with automated feedback providing direction and the ability to track progress and growth within learning domains.

❑ Leadership Participants acknowledged the important of being future focused, preparing students to be future ready.	❑ Leadership Participants indicated the need still existed for 'the school', face-to-face interaction, as schools are in essence a humanistic landscape and profession.
❑ Leadership Participants understood the growing need to teach environmental and socially just pedagogies.	❑ Leadership Participants expressed many questions/concerns on how to address inequity across socio-economic divides and the reliability of the technologies. Need for equity.
❑ Leadership Participants acknowledged an understanding of the impact and challenges of the emerging technologies and changing nature of work on education.	❑ Leadership Participants said support was needed for teachers to engage with learners, as automated and isolated learning. landscapes become a more significant reality for learners
❑ Leadership Participants acknowledged teacher meltdown and the need for improved teacher support and training	❑ Leadership Participants believed time, the fear factor and relevance continue to be areas of most importance for teachers in perception and upskilling in emerging technologies. This has created a gap in ability

Table 1: Leadership Participants Key Statement

Teacher Participants Summary Findings Cycle 2	
❑ Teacher Participants indicated the digital divide needed to be mitigated through ongoing professional development to keep up to date with the latest technology, which is more difficult for low socioeconomic band schools.	❑ Teacher Participants pointed out that it is easier to teach in a face-to-face environment or wholly online environment but running both at once was problematic. This was reference to the COVID period.
❑ Teacher Participants stated in planning for the future, it would be best to educate students for a world that will demand a focus to be placed on skills, rather than content knowledge.	❑ Teacher Participants suggested some emerging technologies raised many ethical questions which can stifle creativity and innovation in teaching and given there are no regulations governing such tools.
❑ Teacher Participants suggest schools are being redefined by technology with some teachers becoming less confident in their ability, while others excelling and becoming leaders in the school.	❑ Teacher Participants wanted access to technology based on artificial intelligence to personalise the learning path of students.
❑ Teacher Participants said they need to adjust their teaching to ensure students have exposure to and experience using new technologies and that the curriculum will need to be reworked to reflect the world that students will be entering, ensuring future skills are being developed	❑ Teacher Participants said there was a growing need to provide for the whole child - the students pastoral, social, education and emotional needs.
❑ Teacher Participants indicated some teachers find it hard to 'keep up' with constant technology change. For students it might mean increased attention deficit symptoms, reduced emotional and social intelligence, technology addiction, social isolation, delayed brain development, and interrupted sleep.	❑ Teacher Participants indicated in the new paradigm of teaching, knowledge is actively constructed, discovered, transformed, and extended by students.

❑ Teacher Participants indicated that they need new skills and new knowledge as they shift from that of content delivery, feedback provider and assessor to that of facilitator, mentor, or a counsellor.	❑ Teacher Participants stated developing and redesigning courses for flexible learning opportunities should be driven by future workforce skills and competencies. However, they continue to be driven by current expectations of meeting a grade or preparation for ATAR.

Table 2: Teacher Participants Key Statements: Cycle 2

3.3. Structure and Organisation of Research Strand Two

The findings are organised as themes under the research questions. Strand two research questionnaires included the following three research study questions to be responded to by the participants:

- **RQ4:** What are the 'forces of change', their implications, and challenges for the future of work and education as perceived by Western Australian school educators?
- **RQ5:** What might learning and teaching look like in the schools of the future?
- **RQ6:** How are Western Australian schools preparing students for future environments?

RQ4: 'Forces of Change' Framework for the Emerging Forms of Learning

The Western Australian school leaders and teachers were asked in an online questionnaire what the implications and challengers for the future of education for each of the *'forces of change' mentioned in the Framework for the Emerging Forms of Learning*. In answering they used the headings provided in the framework. These included the emerging technologies, work and education reimaged and reengineered, and the shifting geo-political landscapes, anthropocene and rising economic inequality. The school leaders and teachers from the three schools participating in strand two of the research study suggested the following implications and challenges faced by 'forces of change'.

School A - Implications of the Forces of Change Cited by Leadership Participants

The School A Leadership Participants indicated there is an increasing movement in artificial Intelligence (AI) and data analytics, but there are no clear guidelines for the use for this technology, and long-term data analysis and their impact on student learning and wellbeing. They believed content, feedback, assessment tools and personalised learning paths will be able to be generated and monitored without the need for an actual teacher being present, and students will be able to learn at their own pace, with automated feedback providing direction and the ability to track progress and growth within learning domains. Learning profiles generated and individualised courses set to achieve standards, benchmarks, and qualifications. They indicated the need still for face-to-face interaction, as schools are in essence a humanistic landscape and profession, that will potentially be even greater as the human connect becomes a form of essential sustenance. There were also concerns of double handling of data, teacher interpretation of data analysis and whether there was a need to upskill teachers in the area data interpretation. They were also a concern by social leaders on how to address inequity across socio-economic divides and the reliability of technology seen in other schools. One Leadership Participant suggested work and education in Australia was changing quicker than they initially thought and the access to learning through the breadth of institutions may provide greater opportunities for learners and change the way schools think. The leader further felt that schools have adapted quicker to shifting geo-political landscapes, anthropocene and rising economic inequality early compared to industry stating that schools are open to learning more how other nations, jurisdictions behave and perform. Another Leadership Participant, on the other hand, argued that we need to intervene in what we teach and how we educate, arguing that it required a process of developing environmentally friendly and socially responsible pedagogies that are relevant to the current situation. Some Leadership Participants indicated, if students are potentially going to have less guidance for their learning in a face-to-face landscape, the potential for increased counsel and managing disappointment, anxiety, failure may become the focal point of the role of the teacher. Further suggesting the skillset required for 'teachers' may shift from that of content delivery, feedback provider and assessor to that of facilitator, mentor, or a counsellor. The Leadership Participants saw the need for enhanced social skills, empathy, learning to manage emotions, seeking support, social interactions potentially becoming at the forefront of the skill required to be able to support, engage with, as automated and isolated learning landscapes become a more significant reality for learners. Furthermore, the Leadership Participants saw pedagogical practice having the challenge of adapting with technology to integrate the human requirements. The implications as cited by School A Leadership Participants are summarised in Table 3.

School	Forces of Change	Implications
School A	Emerging technologies: artificial intelligence and big data analytics	No clear guidelines for the use for this technology
		Data generated and monitored without the need for an actual teacher being present
		Need for face-to-face interaction, as schools are in essence a humanistic landscape and profession
		Questions on how to address inequity across socio-economic divides and the reliability of the technologies
	shifting geo-political landscapes, anthropocene and rising economic inequality	schools have adapted quicker compared to industry
		Need to intervene in what we teach and how we educate, arguing that it required a process of developing environmentally friendly and socially responsible pedagogies that are relevant to the current situation
	Work and Education reengineered and redefined	Shifting role from that of content delivery, feedback provider and assessor to that of facilitator, mentor, or a counsellor.
		Need for enhanced social skills, empathy, learning to manage emotions, seeking support, social interactions
		Support needed for students to engage with learners, as automated and isolated learning landscapes become a more significant reality for learners.

Table 3: Implications of the Forces of Change Cited by School A Leadership Participants

School B - Implications of the Forces of Change Cited by Leadership Participants

School B Leadership Participants stated they understood the purpose of incorporating new emerging technologies into the curriculum is to give students the skills to learn any new emerging technology as technology evolves. Dedicating curriculum around a current emerging trend, may see it outdated and obsolete once students graduate. The more teachers and students use technology in the classroom the more adaptable they become at learning new technology.

Leadership Participants stated time, the fear factor and relevance continue to be areas of most importance for teachers in perception and upskilling in emerging technologies. Time, they explained was needed for teachers to professionally develop in such wide-ranging technology skills, but it was not always available, and teachers were at a loss with where to start. The Leadership Participants indicated has created a gap in ability and perception of ability for many new and experienced teachers. Leadership Participants argued for those educators who have yet to begin their own digital journey, the prospect of introducing augmented reality, robotics, hybrid and virtual schooling and gamification is a bridge too far and many teachers continue to ignore or give up. Another argument Leadership Participants put forward was its relevance to current practice; teachers perceive many of the emerging technologies as novelty, irrelevant or in competition with traditional forms of teaching and learning. To provide a strategic pathway forward, Leadership Participants suggested consideration must be given to upskilling teachers in digital pedagogy and the importance of digital literacy and life skills.

As far as big data analytics is concerned, Leadership Participants suggested the curriculum will need to be updated to provide students with appropriate guidance on how to solve complex problems using big data and algorithmic techniques previously only in the hands of tech companies. Leadership Participants emphasised teaching students how to leverage datasets and apply analytical techniques will be one of the key skills of the future. The gamification of learning, while having the benefit of increased engagement, can promote a kind of 'zero-sum game' competitive approach to learning that can have negative implications. Leadership Participants pointed out this tech approach must be balanced with the promotion of collaboration, communication, and empathy for others.

One Leadership Participant explained that there has been a noticeable shift in the way technology is used in schools in teaching students. This shift, the school leader suggested, has occurred gradually, with many schools implementing a 1:1 device programme, but it has only been in the last four years that fundamental changes in how schools might employ technology have occurred- indicating the responsibility is to enable teachers to utilise the technologies to support student learning and meet education goals. The greater duty is to forecast the effects of future technology to guarantee that systems are prepared to handle this possible shift and that teachers and the broader community are not compelled to change rapidly.

According to the Leadership Participant the primary areas that will be relevant over the next three years are the eventual realisation of augmented reality, artificial intelligence, and decentralised school program delivery. Specifically, with augmented reality, a wearable with an internet connection and a considerable battery life would fundamentally alter how classrooms are constructed, and the quick feedback of outcomes via some sort of glasses without the teacher being aware will reshape the school. Augmented reality technology will result in the fusion of facial recognition, audio recognition, and social networking, fully obstructing students' view of the

world. Furthermore, the Leadership Participant stated asking a question would result in an instantaneous display of the answer to the student, and more crucially, projectors and televisions in the classroom will be replaced with QR codes that stream content to those devices. Additionally, the Leadership Participant suggested artificial intelligence will produce responses to queries that are not technically plagiarised, as the students will provide the original thought that is not fully developed- Quillbot.com and ChatGPT being good examples of artificial intelligence technology now.

Leadership Participants stated If people are changing the work environment and types of jobs then educators need to naturally change the education environment to produce students who have the skills to adapt to this changing landscape. They indicated that the recent pandemic had highlighted the success of *flexible work arrangements* such as working from home, and student online and hybrid learning. The Leadership Participants suggested the pandemic also highlighted the need for socialisation and workplace collaboration, and that hybrid work, both work-from-home and in-person opportunities would provide the most successful options for the current student body/workforce. The opportunities to rethink the school-day or workday have thrown numerous possible options into discussions with flexibility for employees and students. School leaders believed changes in the teaching workforce are unavoidable.

The Leadership Participants indicated that as a generalisation, students are far more globally connected and aware due to instant access to social media, entertainment, news feeds via digital means. The importance of teaching digital literacy and digital citizenship from the earliest opportunities in education will become a fundamental responsibility of all educational institutions. According to one Leadership Participant the shifting geo-political landscape demand that educators use technology to make sustained connections with schools from a wide range of places and circumstances to develop a real sense of global citizenship. The Leadership Participant suggested, educators now have the technological capability to connect classrooms quite seamlessly by using portable conferencing devices and platforms that allow for collaborations across the world. Furthermore, the leader indicated as far as economically friendly and socially just pedagogies, the 'community of inquiry' model is one such method that is particularly powerful and can be employed in both face to face and online settings. Another Leadership Participant stated the capacity to employ engaging presentation skills while communicating online in the workplace will be of increasing importance. The leader declared look no further than the most successful Youtubers who combine their specialist knowledge with an array of multimedia skills to communicate with their audiences. The leader suggested these skills can certainly be applied in educational settings and educators can learn multimedia skills techniques.

The Leadership Participants explained changes in the teaching workforce are unavoidable, but not in the same way that they will occur in other industries, it will always be linked to teaching. A school establishes a space that serves more than academic duties. Teachers they explained would be tasked with the responsibility of improving students' work rather than merely teaching content, as that content gets mechanised, and mass generated more radially. The reality is that the phrase "flipped classroom" has become the de facto standard and will continue to grow in popularity. The fascinating part of work will be determining whether offering lessons to students at home and in class counts as additional workload, and whether parents with sick children can choose to work from home and remotely deliver lessons to schools.

The Leadership Participants believed there will be a huge challenge to overcome the increasing disparity in funding between low socio-economic and high socio-economic schools, since schools with resources can continue to provide face-to-face instruction. The Leadership Participants indicated by observing a teacher's and other students' body language and speech, students can secure more knowledge and a deeper comprehension. With other students from a variety of backgrounds, a student may interact, work out issues, and form connections. Additionally, Leadership Participants suggested it will cause challenges where teachers who have taught the same way for the last 20 years will need to adapt, and new measurements and accountability structures will need to be established to match the shifting delivery modalities. In essence, if your teaching is based on concepts from the 1980s to 2010, you will be unable to engage students without making efficient use of technology. The implications as cited by School B Leadership Participants are summarised in Table 4.

School	Forces of Change	Implications
School B	Emerging technologies	The more teachers and students use technology in the classroom the more adaptable they become at learning new technology
		Time, the fear factor and relevance continue to be areas of most importance for teachers in perception and upskilling in emerging technologies. This has created a gap in ability.
		For those who have yet to begin their own digital journey, the prospect is a bridge too far and many teachers continue to ignore or give up.
		Teachers perceive many of the emerging technologies as novelty, irrelevant or in competition with traditional forms of teaching and learning
		Appropriate guidance on how to solve complex problems using big data and algorithmic techniques previously only in the hands of tech companies
		Responsibility is to enable teachers to utilise the technologies to support student learning and meet education goals
	Shifting geo-political landscapes, anthropocene and rising economic inequality	students are far more globally connected and aware due to instant access to social media, entertainment, news feeds via digital means.
		Importance of teaching digital literacy and digital citizenship
		Shifting geo-political landscape demand that we use technology to make sustained connections with schools from a wide range of places and circumstances to develop a real sense of global citizenship.
	Work and Education reengineered and redefined	Changing work environments demands changing education environment to produce students who have the skills to adapt to this changing landscape. Opportunities to rethink the school-day or workday have thrown numerous possible options into discussions with flexibility for employees and students.
		Success of *flexible work arrangements* such as working from home, and student online and hybrid learning. Change now unavoidable.
		Highlighted the need for socialisation and workplace collaboration, and that hybrid work, both work-from-home and in-person opportunities would provide the most successful options for the current student body/workforce
		Huge challenge to overcome the increasing disparity in funding between low socio-economic and high socio-economic schools, since schools with resources can continue to give face-to-face instruction over technology.

Table 4: Implications of the Forces of Change Cited by School B Leadership Participant

School C - Implications of the Forces of Change Cited by Leadership Participants

School C Leadership Participants stated that artificial intelligence and learning analytics have large implications for the future of education whilst both emerging technologies are in their infancy, they have the potential to greatly change education for the better by providing a personalised and targeted education for each student. Leadership Participants saw emerging technologies becoming an increasing force within education, with teaching staff and staff generally in schools needing to keep pace and develop contemporary and emerging technological skills. Moreover, Leadership Participants indicated the requirement to upskill or retrain would add to an already overloaded staff members workload, suggested while at the start, the learning curve might be steep, they saw the long-term outcome as one where the technologies would create more time for the teachers to enhance their teaching and adeptness at integrating the best technology at the best point in time.

There also saw many implications from the changing models for work, work structures and work arrangements in education with the blurring of the traditional school day and the changing expectations on teachers. Implications include the growing divide between those students who have access to relevant and dynamic education experiences that include up to date information in a rapidly changing world. The Leadership Participants suggested many schools were slow or reluctant to change and this has direct implications on the students in their care.

Leadership Participants indicated it is quite evident that lifelong learning becoming a more prevalent factor. People will need to continually learn, relearn, and unlearn so that they can adapt to the radical technological changes that happen with increasing pace. They explained that teaching students to be adaptable and flexible will become of increasing importance and as such teachers will need to work more collaboratively with students sharing knowledge and wisdom. Leadership Participants said it will also become increasingly important that to remain employable in a more automated job market to have increasing technical skills while also developing human skills concurrently. The Leadership Participants further suggested it may also mean that the undertaking of a Universal Basic Income or Conditional Basic Income is required as there will not be as many jobs available.

The Leadership Participants suggested it is apparent that education in many instances at many institutions is about marketing and what

schools can provide to the market. As such the haves excel and the have nots fall further behind. As such the Leadership Participants argued that education will need to be adaptable enough that it can reach the masses and upskill the least advantaged as there are many other factors that affect their learning journal.

On the notion of shifting geo-political landscapes, anthropocene and rising economic inequality one Leadership Participant suggests the global challenges that are emerging show the importance of working together globally to find a solution, yet each time, people tend to do the opposite and work separately and focusing on our own citizens. The Leadership Participant stated, teachers need to be aware so they can make students aware. According to another Leadership Participant, they stated as the world changes to embrace new futures, so will how and what teachers teach in our educational system will need to keep up with the expanding needs of the 21st century. Furthermore, the Leadership Participant suggested staff development and pedagogy will need to radically change to ensure teachers of future generations provide children with a decent future. Furthermore, the Leadership Participant suggested access to digital literacy skills is essential for 21st century learners. The Leadership Participant indicated students who have access to sophisticated digital technologies and learning will be at an economic advantage. The implications as cited by School C Leadership Participants are summarised in Table 5.

School	Forces of Change	Implications
School C	Emerging technologies	They have the potential to greatly change education by providing a personalised and targeted education for each student
		Emerging technologies will become an increasing force within education with staff needing to keep pace and develop the technology skills suggesting the learning curve might be steep.
		The long-term outcome the technologies would create more time for the teachers to enhance their teaching and adeptness at integrating the best technology at the best point in time
	Shifting geo-political landscapes, anthropocene and rising economic inequality	Global challenges that are emerging show the importance of working together globally to find a solution
		As educator's world changes to embrace new futures, so will how and what teachers teach in our educational system will need to keep up with the expanding needs of the 21st century
		Access to digital literacy skills is essential for 21st century learners.
	Work and Education reengineered and redefined	Changing models for work, work structures and work arrangements in education will result in the blurring of the traditional school day and the changing expectations on teachers.
		The growing divide between those students who have access to relevant and dynamic education experiences including up to date information
		Lifelong learning will become a more prevalent factor. People will need to continually learn, relearn, and unlearn so that they can adapt to the radical technological changes that happen with an increasing pace of life
		Importance of teaching students to be adaptable and flexible, as such, teachers will need to work more collaboratively with students sharing knowledge and wisdom.
		For people to remain employable in a more automated job market they will need to have increasing technical skills while also developing human skills concurrently.

Table 5: Implications of the Forces of Change Cited by School C Leadership Participants

School A - Implications of the Forces of Change Cited by Teacher Participants

School A Teacher Participants indicated collaborative interface technology where students can work collaboratively demonstrate the potential to connect learners based on their interests. The Teacher Participants indicated students can use collaborative interface tools to share and collaborate on assignments, offer, and receive feedback, annotate, discuss, create media, or simply socialise. The tools they state demonstrate to students how cooperation leads to increased knowledge and the development of social and emotional skills such as teamwork. The Teacher Participants stated the collaborative technology tools were used successfully during the COVID pandemic to provide online learning opportunities and demonstrated the vital need for students to develop 21st century capabilities, providing opportunities to acquire the skills that will form both the foundation of, and the mode of expression for, the taught curriculum. According to Teacher Participants emerging technology will provide exciting new opportunities. Whilst some technologies, such as, artificial intelligence (AI), facial recognition needs to be approached with caution, the possibilities are staggering. Teacher Participants saw schools being redefined by technology with some teachers in schools becoming less confident in their ability, while others excelling and becoming leaders in the school. This divide they suggested will need to be

mitigated through ongoing professional development to keep up to date with the latest technology, which they believe will become more and more difficult for low socioeconomic band schools. Teacher Participants also stated, when it comes to planning for the future, it would be best to educate students for a world that will be forever in flux; politically, economically, and socially. This the Teacher Participants explained would require flexibility and would demand a focus to be placed on skills, rather than content knowledge. The Teacher Participants indicated they will need to continually adjust their teaching to ensure students have exposure to and experience using new technologies and the curriculum will need to be reworked to reflect the world that students will be entering, ensuring future skills are being developed while in the education system. Teacher Participants pointed out it will include developing an understanding of how personal data is used and stored and the concepts behind blockchain technologies. The Teacher Participants stated work from home culture will slowly start to trickle into education systems. Families will require more flexibility and options in relation to face to face or remote/ online learning and the requirement for students to be physically present at school will change. One Teacher Participant suggested schools and education systems and institutions will be required to provide more wrap around services that cannot be provided by families suggesting these could include medical, psychological, or behavioural support. The Teacher Participant also suggested with the potential impact of major social, political, environmental, and economic trends, such as the rise of Artificial Intelligence (AI), automation, shifting geo-political landscapes, anthropocene and the escalating economic inequality, schools and school systems will have to make decisions on their stance and how this is communicated or taught to students in the classroom. This will reflect changes in the aims of education. The implications as cited by School A Teacher Participants are summarised in Table 6.

School	Forces of Change	Implications
School A	Emerging technologies	Collaborative interface technology used to develop 21st century capabilities
		The digital divide needs to be mitigated through ongoing professional development to keep up to date with the latest technology, which is more difficult for low socioeconomic band schools
	Shifting geo-political landscapes, anthropocene and rising economic inequality	Education systems and institutions required to provide more wrap around services that cannot be provided by families
		Teachers planning for the future, it would be best to educate students for a world that will be forever in flux; politically, economically, and socially, which would require flexibility and demand a focus to be placed on skills, rather than content knowledge.
	Work and Education reengineered and redefined	Schools being redefined by technology with some teachers becoming less confident in their ability, while others excelling and becoming leaders in the school.
		Teachers need to adjust their teaching to ensure students have exposure to and experience using new technologies and the curriculum will need to be reworked to reflect the world that students will be entering, ensuring future skills are being developed

Table 6: Implications of the Forces of Change Cited by School A Teacher Participants

School B - Implications of the Forces of Change Cited by Teacher Participants

School B Teacher Participants indicated there was currently a range of learning options schools are providing- face to face, hybrid, and virtual schooling as a response to the Australia's COVID isolation and lockdowns. The Teacher Participants stated during this period they ran dual teaching options at the same time, and at times felt, they were doing neither mode well when trying to provide class differentiation and classroom management. This they explained while trying to meet the individual needs of the students at home and ensuring they had appropriate screen time. The Teacher Participants pointed out that teachers are constantly looking towards ways to provide online early primary education that caters for hands on activities using adaptive technology to adjust their teaching to meet the different needs of their students. Teachers they pointed out have monitored how their online/hybrid students are progressing so they can pinpoint the areas of concern. The Teacher Participants stated during the pandemic with many students having to stay at home and parents still needing to work, it was very difficult to support students with their work, with feedback, hints, and suggestions, indicating the feedback is easy in a face-to-face environment or wholly online environment but running both face-to-face and online at once was problematic. On another matter one teacher indicated it is essential for students to be taught to question what they read online early and look for multiple perspectives, indicating the International Baccalaureate for Primary Years is a good start for student as it fosters inquiry as they move through their schooling assisting them become familiar with shifting geo-political landscapes, anthropocene and rising economic inequality. The Teacher Participants also suggested teachers will need to have regular exposure and or training in emerging technologies as the pace of technologies is far quicker than in the past. The growth in technologies the teacher indicated will require a more dedicated and sophisticated teaching

workforce and may require more rigourous entry requirements for becoming a teacher. Teacher Participants agreed the teaching profession needs to be valued more in society and teachers will need to be very creative in teaching digital literacies, particularly in low socioeconomic schools where resourcing is more difficult. The constant change of technology Teacher Participants stated has implications for staff and students, indicating some staff find it hard to 'keep up'. For students the Teacher Participants suggested it is impacting the way their brains work, which might mean increased attention deficit symptoms, reduced emotional and social intelligence, technology addiction, social isolation, delayed brain development, and interrupted sleep. The Teacher Participants suggested these side effects are all possible side effects of excessive screen time and technology usage. The implications as cited by School B Teacher Participants are summarised in Table 7.

School	Forces of Change	Implications
School B	Emerging technologies	Schools now providing- face to face, hybrid, and virtual schooling as a response to the Australia's COVID isolation and lockdowns.
		Some staff find it hard to 'keep up' with constant technology change. For students it might mean increased attention deficit symptoms, reduced emotional and social intelligence, technology addiction, social isolation, delayed brain development, and interrupted sleep.
		Teacher will require regular exposure and training in emerging technologies as the pace of these technologies is far quicker than in the past requiring a more dedicated and sophisticated teaching workforce and may require more rigourous entry requirements to become a teacher.
	Shifting geo-political landscapes, anthropocene and rising economic inequality	International Baccalaureate a good start for students as it fosters inquiry assisting them become familiar with shifting geo-political landscapes, anthropocene and rising economic inequality.
	Work and Education reengineered and redefined	Essential for students to be taught to question what they read online early and look for multiple perspectives
		Constantly looking towards ways to provide online early primary education that caters for hands on activities using adaptive technology to adjust their teaching to meet the different needs of their students.
		Easier to teach in a face-to-face environment or wholly online environment but running both at once was problematic.

Table 7: Implications of the Forces of Change Cited by School B Teacher Participants

School C - Implications of the Forces of Change Cited by Teacher Participants

School C Teacher Participants stated with the advent of emerging technologies like Artificial Intelligence (AI) and facial recognition raises many ethical questions which are becoming far more philosophical. This Teacher Participants suggested might lead rightly or wrongly to more time being spent on the ethic debate and less time on the technology's creativity and innovation. This, according to the Teacher Participants, would leave their colleagues feeling less informed and maybe without the ability to fully engage in what the future holds, implying that the problem could be due to cognitive human bias or inadequate and insufficient knowledge. This, according to the Teacher Participant, may be an example of going too quickly and without adequate care and consideration.

The biggest hurdle Teacher Participants saw was Australia's inability to actively take part in living and acting in sustainable ways. The Teacher Participants stated they can teach living and acting in sustainable ways to the students through hands-on activities and by involving them in acting sustainably, but what we teach and inspire our students to do is completely at odds to how we act and behave ourselves. Moreover, the Teacher Participants indicated in areas like fuel emissions, generation of electricity, mining, encouraging changes to minimise global warming and not utilising the skills set and innovation that we have in Australia, we are seen lacking in becoming a positive driving force in this area and sending the wrong messages to our students. Teacher Participants indicated with online learning becoming the normal there are implications to be managed, including student engagement, teacher effectiveness, social intelligence development and getting value from synergistic conversations. The other emerging technologies they suggested may assist, for example chatbots for maths questions or facial recognition with attendance. The upskilling of teachers, WIFI Internet dependence and excessive use of the Internet may be detrimental of one's physical, psychological, social well-being. The Teacher Participants also cited the regional and remote digital divide are all areas that will need to be bridged as well as safety issues associated with more online exposure they indicated will need to be addressed. Teacher Participants stated there are ethical concerns with some emerging technologies, given there are not

widely used or accepted regulations governing such tools, such as facial recognition, which means data and analytics leaders need to turn to digital ethics to use facial recognition technology responsibly. The implications as cited by School C Teacher Participants are summarised in Table 8.

School	Forces of Change	Implications
School C	Emerging technologies	Some emerging technologies raise many ethical questions which can stifle creativity and innovation in teaching
		Emerging technologies an aid to teaching
		Upskilling of teachers, Internet dependence and excessive use of the Internet may be detrimental to one's physical, psychological, social well-being
		Ethical concerns with some emerging technologies, given there are not widely used or accepted regulations governing such tools
	Shifting geo-political landscapes, anthropocene and rising economic inequality	Sending mix message to students on sustainability
		Digital divide as well as safety issues associated with more online exposure are all areas that will need to be bridged
	Work and Education reengineered and redefined	Online learning becoming the normal there are implications to be managed, including student engagement, teacher effectiveness, social intelligence development and getting value from synergistic conversations

Table 8: Implications of the Forces of Change Cited by School C Teacher Participants

School A - Challenges of the Forces of Change Cited by Leadership Participants

According to one Leadership Participant life is governed by change and those who focus solely on the past or present are certain to overlook the future, however the leader suggested, change for the sake of change might be detrimental to attempts to enhance education. The leader stated educators need to make sure we interrogate the data before making the change.

The Leadership Participants explained educators do need to recognise that schools do play an integral part in the formation of a student and that change can result in consequences suggesting according to recent studies, students do better in schools with better physical learning settings as an example. The Leadership Participants agreed that access to technologies and the upskilling of staff in emerging technologies can present challenges as do opposing ideologies and pedagogies. According to the Leadership Participants the challenge for teachers is the need to have the skillset and mindset that can meet a paradigm shift for emerging technology standards together with providing the pastoral, social and emotional needs of their students. The Leadership Participants indicated that the introduction of technology to enhance student learning and provide personalised learning paths requires access to adequate funding. The Leadership Participants indicated, schools who do not have access to technology based on artificial intelligence to personalise the learning path of students while reducing teachers' workload, including the technical support, runs the risk of inequality and further technology divide.

One Leadership Participant explained that schools need to be able to adapt with greater pace to the shifting needs of society, rather than being reactionary. The Leadership Participant suggested schools should be able to be in the forefront of pedagogical changes, for example: 1) those with learning spaces that invite collaboration, counsel, thematic differentiation, and personalised learning paths; 2) opportunity for students to develop a skill set based upon soft skills, EQ, solution processed learning; 3) practical skills that allow students to be creative and critical thinkers with content that is both genuine and relevant and real world.

Furthermore, the Leadership Participant suggested, even with a remote learning model, students need to be able to collaborate and engage with peer learners to be able to communicate their learnings. Leadership Participants explained students need opportunities to reflect upon the learning process in meaningful ways using digital learning platforms that are both easy to navigate and that are designed to support the requirements of the modern learner. The challenges as cited by School A Leadership Participants are summarised in Table 9.

School	Forces of Change	Challenges
School A	Emerging technologies	Access to technologies and the upskilling of staff in the emerging technologies
		Access to technology based on artificial intelligence to personalise the learning path of students
		Ability to meet a paradigm shift for emerging technology standards together with providing the pastoral, social and emotional needs of their students
	Shifting geo-political landscapes, anthropocene and rising economic inequality	Ability to be to adapt with greater pace to the shifting needs of society, rather than being reactionary
		Students engaged in remote learning need to be able to collaborate and engage with peer learners to communicate their learnings. They need opportunities to reflect upon the learning process in meaningful ways using digital learning platforms that are both easy to navigate and that are designed to support the requirements of the modern learner.
	Work and Education reengineered and redefined	Change for the sake of change that might be detrimental to attempts to enhance education
		Opposing ideologies and pedagogies can present challenges
		Introduction of technology to enhance student learning and provide personalised learning paths that requires access to adequate funding
		Ability of schools to be in the forefront of pedagogical changes.

Table 9: Challenges of the Forces of Change Cited by School A Leadership Participant

School B - Challenges of the Forces of Change Cited by Leadership Participants

School B Leadership Participants agreed schools must recognise that without investment in teacher professional development in the use of technology to aid student learning, all investment will be in vain. The Leadership Participants explained simply investing in infrastructure is insufficient; even the best network in the world will not aid in the teaching of students without technology-enhanced instruction. They stated continuous investment will be required to pay for training staff to assist teachers.

The Leadership Participants pointed out the initial challenge for educational institutions according to one school leader will be to place importance on finding educators who can lead teachers in digital pedagogy, digital citizenship, and digital competencies. The Leadership Participants explained leadership in leading training in these areas is sorely lacking as the confusion between pedagogical specialists and technology specialists continue to blur the landscape and the impact on teacher willingness to develop in this area. Leadership Participants believed developing and redesigning courses for flexible learning opportunities should be driven by future workforce skills and competencies. However, the Leadership Participants continue to be driven by current expectations of meeting a grade or preparation for ATAR.

Failure to provide open-ended, creative opportunities and digital skills through a digitally literate curriculum could render the current traditional model of education redundant. Leadership Participants indicated students can and will access what they need at point of need, on-demand from anywhere in the world. They believe teachers will need to become adept at shaping opportunities and directing content in a rapidly changing space.

One Leadership Participant stated the current generation of students are more globally, environmentally, and socially conscious than previous generations. They are also born into a world of technology and Artificial Intelligence (AI). The Leadership Participants pointed out the challenge for educators will be to rethink educational spaces whether digital or physical to allow for flexibility (time and space) and personalisation. Environmental and social connection will be as important as academic competence and should therefore be considered as part of educational policy and practice. Another Leadership Participant suggested a key challenge is striking the appropriate balance between maximising online learning opportunities with the need for students to be connected socially at school. The Leadership Participants suggested that schools must consider the challenge the technologies are having on student attention spans. The school leader asked, how much time are teachers prepared for a student to spend using tech devices in each day? The Leadership Participant stated rising levels of anxiety and stress in students are major warning signs. The Leadership Participants stated being able to teach skills will become increasingly central, which implies that there will be an expectation that you can apply the skills you are currently teaching in your own job. The Leadership Participants believe that subjects such as languages will suffer significant declines because of technological advancements in conversation translation, resulting in job losses. The Leadership Participants also believe that English as a primary subject will also need to evolve to be more engaging, or else Artificial Intelligence (AI) will be able to complete most of the work required of students. Leadership Participants acknowledged the challenge will be educating parents about the practical application of schooling, that it would be necessary to reframe talks around parents' expectations of being involved in their child's digital life while also emphasising the need of a skills-based education above rote academic knowledge within subject areas. This the Leadership Participants said is a problem that affects not just one economic

sector, but all facets of schooling. The challenges cited by School B Leadership Participants are summarised in Table 10.

School	Forces of Change	Challenges
School B	Emerging technologies	The need to invest in teacher professional development in the use of technology to aid student learning. Simply investing in infrastructure is insufficient
		The need to pay for staff to assist teachers and to find educators who can lead teachers in digital pedagogy, digital citizenship, and digital competencies
		Leadership in digital pedagogy, digital citizenship and digital competencies is lacking muddied by the confusion between pedagogical specialists and technology specialists
	Shifting geo-political landscapes, anthropocene and rising economic inequality	Striking the appropriate balance between maximising online learning opportunities with the need for students to be connected socially at school
		Educators will be to rethink educational spaces whether digital or physical to allow for flexibility (time and space) and personalisation.
	Work and Education reengineered and redefined	Developing and redesigning courses for flexible learning opportunities should be driven by future workforce skills and competencies. However, they continue to be driven by current expectations of meeting a grade or preparation for ATAR.
		Teaching skills will become increasingly central, which implies that there will be an expectation that you can apply the skills you are currently teaching in your own job
		Educating parents about the practical application of schooling
		Failure to provide open-ended, creative opportunities and digital skills through a digitally literate curriculum could render the current traditional model of education redundant.

Table 10: Challenges of the Forces of Change Cited by School B Leadership Participants

School C - Challenges of the Forces of Change Cited by Leadership Participants

According to School C Leadership Participants cost, support and a reluctance to change are all challenges associated with new and emerging technologies. The challenges associated with changing models for work, work structures and work arrangements are also apparent as educators are experiencing increased workloads and expectations that limit the progress of future education and restrict the rate of change.

One Leadership Participant stated a top down and centralised approach to curriculum makes change challenging and slow to implement at a classroom level. Furthermore, the Leadership Participant pointed out, the curriculum is focused on content that can often be dated and the requirement to include and implement skill development is limited.

Leadership Participants say the greatest challenge will be to ensure that there is equity across all education settings so that gaps do not widen and that all students can develop the necessary technical and human skills to thrive in an ever-changing world.

With the changing world of work and education leaders suggested the challenge will be to develop the entrepreneurial capacity of students so they can transition between multiple roles or work con-current roles. They stated the current model of education does not accommodate for entrepreneurship capacity particularly in the upper years where the ATAR is still the dominant measure for school transitions suggesting schools need to challenge students to develop skills from the primary stage that could potentially generate income in the longer term.

Another challenge cited by one Leadership Participant was the ability to address an individual's neurodiversity at their point of need. ADHD, Autism, Dyspraxia, and Dyslexia are all neurodiverse disorders that fall under the "neurodiversity" category. The Leadership Participant explained this is increasingly difficult to achieve in the current scenario of one teacher per 25 students, suggesting teachers when set in the role of mentors and coaches may be able to stem this challenge with the flexibility of the hybrid learning model which can support neurodiversity inclusion. The Leadership Participants stated, for students to engage in stay-at-home online or hybrid learning models from an early age, it would impact families, their finances, their health and well-being and accommodation of space in the home. Reducing the burden on parents and helping teachers and schools make the most of digital learning will be a challenge.

In addition, Leadership Participants indicated constant changes too in curriculum will require teachers to continually upskill and alter their delivery. Schools will find it challenging to provide the time for staff to upskill in the current schooling environment. The challenges as cited by the Leadership Participants in School C are summarised in Table 11.

School	Forces of Change	Challenges
School C	Emerging technologies	Cost, support, and a reluctance to change
		Curriculum change will require teachers to continually upskill and retrain, and alter their delivery
	Shifting geo-political landscapes, anthropocene and rising economic inequality	To ensure that there is equity across all education settings so that gaps do not widen and that all students can develop the necessary technical and human skills to thrive in an ever-changing world
		The ability to address an individual's neurodiversity at their point of need
	Work and Education reengineered and redefined	Experiencing increased workloads and expectations that limit the progress of future education and restrict the rate of change
		A top down and centralised approach to curriculum makes change challenging and slow to implement at a classroom level
		Curriculum is focused on content that can often be dated and the requirement to include and implement skill development is limited
		To develop the entrepreneurial capacity of students so they can transition between multiple roles or work con-current roles

Table 11: Challenges of the Forces of Change Cited by School C Leadership Participants

School A - Challenges of the Forces of Change Cited by Teacher Participant

School A Teacher Participants stated technology had the potential to alleviate teacher workload. They cited Artificial Intelligence marking and the Adaptive PAT testing which demonstrated the potential benefit of emerging technologies. The Teacher Participants affirmed too that they believed technology did not threaten the role of the teacher, nor did they believed teachers would one day be replaced by robots, indicating technology cannot guide learning or ascertain misconceptions within 'correct' work.

Teacher Participants also indicated that the education model remains the same as before the pandemic with a 'return to school' a priority. Moreover, the Teacher Participants stated while many other professions can enjoy flexibility in working from home this is not going to be an option for the teachers because they believed duty of care is dependent on vicinity to the students. Furthermore, the Teacher Participants suggested with the changing nature of work and calls for pedagogies to shift that considers the social impact of the changes, particularly for parents work arrangements, there will be a need to ascertain the different home life routines and family dynamics to inform what we teach and how.

Another Teacher Participant stated due to the inequality experienced in our consistently more polarised society, technological developments seem to be outstripping attempts to level the educational playing field. As a result, one teacher believed there is concern that the technological disparity may lead to a further disconnection within different sections of the Australian society. The Teacher Participant also believed that the uncertainty behind the evolving workplace sector is a point of concern for current teachers, asking, is the curriculum even relevant anymore, and whether there should be a dramatic shift to skills rather than knowledge-based learning. Furthermore, the Teacher Participant further questioned whether educators are stymieing the critical development and innovation of students due to archaic teaching practices and asked with the changing nature of work how educators should prepare current students for the future of work. Asking should educators be focusing more on entrepreneurial skills and interpersonal skills? … will the current curriculum be relevant in 20 years? … will there be retraining obligations for current teachers? For this Teacher Participants, teaching at this time is both an exciting and nerve-wracking period that they face given the speed of innovation and development increase in both ingenuity and daring. The teachers stated the digital divide between schools those that can and cannot afford the latest technologies will only widen, particularly in the low socio-economic schools. Furthermore, Teacher Participants asked, how will emotional intelligence or 'soft skills' be developed if educators come in the form of holographic teachers, humanoids, or robots. Teacher Participants indicated that schools are more and more expected to provide services that aren't education related, that redirect already depleted funds and time and effort from teaching their students. The Teacher Participants explained they are now expected to be aware of so many things outside there area of expertise or that they thought should be developed in the home such as social and life skills. This the Teacher Participants believe will make the profession less attractive. The challenges as cited by the School A Teacher Participants are summarised in Table 12.

School	Forces of Change	Challenges
School A	Emerging technologies	Potential to alleviate teacher workload without threating the role of the teacher
		technological disparity may lead to a further disconnection within different sections of our society.
		how will emotional intelligence or 'soft skills' be developed if educators come in the form of holographic teachers, humanoids, or robots
	Shifting geo-political landscapes, anthropocene and rising economic inequality	The digital divide between schools' particularly in the low socio-economic schools
		Schools are more and more expected to provide services that aren't education related, that redirect already depleted funds and time and effort from teaching their students.
	Work and Education reengineered and redefined	Education model remains the same as before the pandemic with a 'return to school' a priority while other professions enjoyed flexibility arrangements. Not an option for the teachers because they believed duty of care is dependent on vicinity to the students
		With the changing nature of work and calls for pedagogies to shift that considers the social impact of the changes, particularly for parents work arrangements, there will be a need to ascertain the different home life routines and family dynamics to inform what we teach and how.
		Teachers questioning whether the curriculum even relevant anymore, and whether there should be a dramatic shift to skills rather than knowledge-based learning
		Teacher Participants questioned whether they are stymieing the critical development and innovation of students due to archaic teaching practices and asked with the changing nature of work how we should prepare our current students for the future of work

Table 12: Challenges of the Forces of Change Cited by School A Teacher Participants

School B - Challenges of the Forces of Change Cited by Teacher Participants

One School B Teacher Participants raised some concerns about technology and social media addiction having noticed a significant change in the student population over the last 10 years of teaching. The Teacher Participants also had concerns about pay for schoolteachers and saw it as a challenge as it currently doesn't attract the brightest and best teachers into the Australian education system. Moreover, the Teacher Participants indicated it was difficult to compare students across different backgrounds with standardised tests making it challenging for students in low socio-economic schools to gain fair entry into university. One Teacher Participant stated a significant challenge was the pace with which technologies has developed, the financial ramifications for the school and the teachers' capacity and time to keep upskilled. The Teacher Participant pointed out that many teachers in schools are often less tech savvy than their students. Furthermore, the Teacher Participant when on to further state the challenges for students in using technologies, such as, gamification software, indicating that for some students this format of learning can be very addictive and for some students difficult because they cannot regulate or manage their time. This same Teacher Participant also believed the unknown nature of the future of work renders previous models of education redundant as they are preparing students for jobs that don't exist yet, with technologies that haven't been invented yet, which they stated poses challenges for traditional models of education.

Teacher Participants indicated that occupations would change dramatically, as would work structures, allowing for working remotely at home. According to Teacher Participants, the changing nature of work will allow changes to the education landscape for parents who may also be helping children learn at home as well. Teacher Participants believed it is important to change the understanding of parents and society that young children need to inquire, challenge and question and not just rote learn and regurgitate. The Teacher Participants indicated it was important to increase societies understanding that children should formulate questions, immerse themselves in areas of interest, investigate multiple perspectives, create their own ideas, and reflect on their learning to create action is as important as following the current chosen curriculum. The challenges as cited by the School B Teacher Participants are summarised in Table 13.

School	Forces of Change	Challenges
School B	Emerging technologies	Concerns about technology and social media addiction
		The fast pace of technology change, the financial ramifications for the school and teachers' capacity and time to keep upskilled
		Teachers in schools are often less tech savvy than their students
	shifting geo-political landscapes, anthropocene and rising economic inequality	Pay for schoolteachers as it currently doesn't attract the brightest and best teachers
		Comparing students across different backgrounds with standardised tests makes it challenging for students in low socio-economic schools to gain fair entry into university
	Work and Education reengineered and redefined	The unknown nature of the future of work renders previous models of education redundant as they are preparing students for jobs that don't exist yet, with technologies that haven't been invented yet, posing challenges for traditional models of education.
		With the changing nature of work, changes to the education landscape for parents may also help children learn at home.
		Challenge to change the understanding of parents and society that young children need to inquire, challenge and question and not just rote learn and regurgitate.

Table 13: Challenges of the Forces of Change Cited by School B Teacher Participants

School C - Challenges of the Forces of Change Cited by Teacher Participants

One School C Teacher Participant specialising in mechatronics and STEM saw emerging technologies as a critical component of their work. The Teacher Participant believed it was their role to discuss and make students aware of the changing face of technologies and how it could be used to assist there learning to meet curriculum goals, however this knowledge was often tempered by the needs of the curriculum and the ability of the students. The Teacher Participant indicated this is in an area that teachers have not been trained in, so time must be found to understand and relate to the emerging technologies on top of the normal teaching duties. The Teacher Participant saw the upskilling of staff as probably the biggest challenge, and as with all new technologies some succeed and some fail. Another Teacher Participant questioned why teachers are teaching areas that are deemed superfluous to the needs of society when the diversity and flexibility of thought should be encouraged as a way of keeping pace with technology. According to the Teacher Participant his can be seen clearly when students are having to write exams by hand, rather than by computer when it is appropriate. The Teacher Participant stated the fact that most subjects are taught in isolation and yet everything is interrelated is a concern and that it seems that this is done for the ease of assessment and pigeon-holing students rather than giving something that is truly meaningful. The Teacher Participant said it would also mean the development of a new skill set for the teachers.

Another Teacher Participant explained chasing technology fads, the funding and training required, is unhelpful in the long term and wastes resources in the short term. The Teacher Participant stated research and the development of new pedagogies that can assist and educate decision-makers about the value of emerging technologies was essential so that they don't waste valuable resource funds. The t Teacher Participant indicated perhaps there can be a body established that provides advice to decision-makers, like 'Choice Magazine', about the usefulness, shortcomings, and long-term issues around some of the emerging technologies. Teacher Participants stated the aging teaching demographic has seen many teachers resistant to change or who have felt threatened by the new technologies as they look to slow down and transit to retirement. The Teacher Participants suggested this was the case if education remains a "learn content, remember content for test" focus, then the relevance of schooling in a technology rich world will continue to be challenged. Furthermore, the Teacher Participants indicated that education is not only about passing on past knowledge and practices but importantly about entrusting the future to the next generations, equipping them with the skills and capabilities to survive, to organise, to think and plan and act. The Teacher Participant stated it has long been debated how we balance these two dimensions of education with the current dominant curriculum policy focussing mostly on passing on past knowledge. Furthermore, the Teacher Participant pointed out that teachers are therefore ill-equipped to deal with disruptions, and to work with young people on the present and future, to connect knowledge and action. The challenges as cited by School C Teacher Participants are summarised in Table 14.

School	Forces of Change	Challenges
School C	Emerging technologies	Concerns about how technology and social media addiction might affect student learning- an area that we have not been trained in, so time must be found to understand and relate to these technologies on top of the normal teaching duties.
		Time to discuss and make students aware of the changing face of technologies and how it could be used to assist there learning to meet curriculum goals, however this knowledge was often tempered by the needs of the curriculum and the ability of the students.
		Chasing technology fads, the funding and training required, is unhelpful in the long term and wastes resources in the short term
	shifting geo-political landscapes, anthropocene and rising economic inequality	Aging teacher demographics has seen many teachers resistant to change or who have felt threatened by the new technologies as they look to slow down and transit to retirement.
		Education is not only about passing on past knowledge and practices but importantly about entrusting the future to the next generations, equipping them with the skills and capabilities to survive, to organise, to think and plan and act, but how do we balance these two dimensions.
	Work and Education reengineered and redefined	Why we are teaching areas that are deemed superfluous to the needs of society when the diversity and flexibility of thought should be encouraged as a way of keeping pace with technology
		Most subjects are taught in isolation and yet everything is interrelated is a concern and that it seems that this is done for the ease of assessment and pigeon-holing students rather than giving something that is truly meaningful. The challenge is the development of a new skill set for teachers.

Table 14: Challenges of the Forces of Change Cited by School C Teacher Participants

RQ4: 'Forces of Change' as Perceived by the WA Leadership and Teacher Participants

The WA school Leadership Participants and Teacher Participants were then asked what they perceived were the 'forces of change,' their implications and challenges for the future of education. The perceived forces of change as provided by the school leaders and teachers in questionnaire one is outlined below and the top three issues concerning systems change or innovation that education faces today referenced in detail in Appendix 2. The Leadership Participants and Teacher Participants cited resources needed to address the issues and resourcing required, and if the resources were not presently available, what they thought a school leader or teacher could do.

School A - Implications and Challenges Perceived Forces of Change Cited by Leadership Participants

School A Leadership Participants suggested staff shortages and retention and recruitment of highly skilled teachers, the ageing teaching population and hybrid learning an implication and ongoing challenge for schools. One area of significant concern was the 'years of experience' factor of staff. Leadership Participants indicated a concern was not having teachers with high levels of experience it makes it difficult to nurture and support beginning teachers. The Leadership Participants suggested teachers with less than 5 to 7 years of experience require careful mentorship and time to develop their skills. Allowing teachers to have support structures in places enables a quality teaching and learning program to flourish. Furthermore, the Leadership Participants suggested retaining quality staff within the classroom is always a challenge, as many highly skilled teachers make a transition to leadership and shift out of the classroom. An ageing teaching population was also cited as another factor and according to the Leadership Participants played a significant part in changing the shape of a school.

The world's population is ageing, and it affects practically every country, and profession. It's easy to see how the teaching staff is affected by this trend. Leadership Participants suggested as teachers near retirement, the education profession will likely witness an increase in part-time teachers during the next decade. The enormous departure will leave a plethora of leadership positions open for younger teachers to occupy. It is, without a doubt, a significant responsibility. It is, however, a once-in-a-lifetime opportunity. On another matter one school leader queried if remote learning caters to all the needs of the students through reactions to data and individualised learning paths, will students need to engage on a campus? … is there and age and stage whereby a transition to a remote platform becomes the opportunity to engage with learning that suits the needs of individuals through self-managed time, assessments and responding to feedback?

Emerging technology, according to Leadership Participants, allows for increased personalisation of learning, data mining for responsive programming, and collaborative differentiation. The Leadership Participants indicated that they must be able to understand statistics and use data to make decisions. Data is used to identify trends, determine objectives, and communicate their message in reports and community presentations. This, the

Leadership Participants said, would put pressure on teachers to adapt and be accountable for each student's unique experience. The implications and challenges of the perceived forces of change cited by the School A Leadership Participants are shown in Table 15.

School A Perceived Forces of Change Cited by Leadership Participants
Staffing shortages
Retention and recruitment of highly skilled teachers
Ageing teaching population
Remote learning

Table 15: School A Perceived Forces of Change by the Leadership Participants

School B - Implications and Challenges Perceived Forces of Change Cited by Leadership Participants

School leaders in School B suggested 'globalisation of education' and 'advancements in neuroscience and social media' an implication and ongoing challenge for schools. According to one Leadership Participants, learners of any age can access any subject and learning area at any time through online learning. Students of any age can sign up for courses run by amateurs or professionals and have flexibility in when, where and how long it takes them to complete the course. The Leadership Participants stated students can complete the course as many times as they like over a lifetime. The Leadership Participants suggested this is a major challenge for educational institutions to compete against in terms of purpose for learning, flexibility, personalisation, and cost effectiveness. Institutions will need to offer something more to remain relevant. Advancements in neuroscience another school leader will provide a much deeper scientific understanding of how we learn will have a profound impact on educational policy and practice. Social media the school leader said has impacted democracies around the world, polarising viewpoints and placing greater stress on our social fabric and on the social value of the concept of a school by society, on what a school means to a community. The implications and challenges of the perceived forces of change cited by the School B Leadership Participants are summarised in Table 16.

School B Perceived Forces of Change Cited by Leadership Participants
Globalisation of education'
Advancements in neuroscience
Ageing teaching population
Social media

Table 16: School B Perceived Forces of Change Cited by Leadership Participant

School C - Implications and Challenges Perceived Forces of Change Cited by Leadership Participants

School C Leadership Participants suggested machine learning and adaptive technologies, mental health and wellbeing, the aging population and unconscious bias as important forces of change. Developing greater understanding of the unconscious biases that individuals have and how to diminish for example conformity, confirmation, or attribution bias. The nature of gender and sex identity was another force of change a leader suggested. Machine learning and adaptive technologies Leadership Participants believed will have significant implications for the level of differentiation possible in schools and positive student learning outcomes. The Leadership Participants indicated teachers are too time poor to effectively differentiate their lessons and this is where technology can play a part. Emerging technologies they suggested will be able to assist teachers with automated marking of extended response answers, in the future. One school leader also stated unconscious bias has a significant impact on how individuals engage with one another and how they view their world at large. The Leadership Participants saw managing change and educating educators on unconscious bias a challenge, and then how to impart that to students, knowing that much of this bias is developed in the pre-school years where parents have the greatest impact. The implications and challenges of the perceived forces of change cited by the School C Leadership Participants are summarised in Table 17.

School C Perceived Forces of Change Cited by Leadership Participants
Machine learning and adaptive technologies
Mental health and wellbeing
Aging population
Unconscious bias

Table 17: School C Perceived Forces of Change Cited by Leadership Participants

School A - Implications and Challenges of Perceived Forces of Change Cited by Teacher Participants

Teacher Participants suggested that international influences were an important force of change and would consider how do other countries and changing global school systems respond to new forms of learning to assist students to adapt and prosper in a rapidly changing environment and for society to advance without leaving anybody behind. Wealth disparity and its impact on children's

education was another perceived force of change cited by the teachers. Teacher Participants indicated, as the world becomes more and more polarised in terms of wealth, they asked what are the implications for the children of the future? Furthermore, the Teacher Participants asked, given they are teaching in a high socio-economic band school, does the burden of responsibility in terms of educating compassionate and egalitarian boys fall with them … and they questioned about how they might develop the next generation of positive leaders, suggesting that they give students as much control over their learning as possible; assist students in becoming adept at learning new tools; encourage students to try new things and take risks; and provide opportunities for students to be creative. The implications and challenges of the perceived forces of change cited by the School A Teacher Participants are summarised in Table 18.

School A Perceived Forces of Change Cited by Teacher Participants
International influences
Wealth disparity and its impact on children's education attract

Table 18: School A Perceived Forces of Change by Teacher Participants

School B - Implications and Challenges Perceived Forces of Change Cited by Teacher Participants

School B Teacher Participants indicated there is limited uniformity in curriculum focussing on the social and emotional health of students. The Teacher Participants suggested social and emotional strategies are not necessarily taught at home, and schools are relied on to provide this education. The reliance on schools for emotional strategies they stated was heightened by students struggling with the demands of the current curriculum, parents who are not necessarily equipped to deal with their technologically advanced children and a current curriculum that does not place social and emotional health as a priority. Teacher Participants indicated there was a need for a focus on social media and its impact on the mental health of the students. Furthermore, the Teacher Participants were also concerned about the addictions associated with several technologies such as snapchat, tik tok and Instagram. Moreover, Teacher Participants suggested that social media might raise student anxiety and depression, overshadowing any possible educational benefits. They also claimed that students' capacity to communicate was declining because of their use of social media. The teachers also agreed the forces of change cited in the *Framework for the Emerging Forms of Learning* were most significant in terms of bringing about educational change. The implications and challenges of the perceived forces of change cited by the Teacher Participants in School B are summarised in Table 19.

School B Perceived Forces of Change Cited by Teacher Participants
Social and emotional strategies needed not necessarily taught at home
Focus on 'social media' impacting the impact on the mental health of the students
Addictions associated with technology

Table 19: School B Perceived Forces of Change Cited by Teacher Participants

School C - Implications and Challenges Perceived Forces of Change Cited Teacher Participants

School C Teacher Participants suggested it was important that funding be offered to those providing educational resources which are at the forefront of technology and that Professional Development be provided to staff and students at the same time by the experts in the field. The Teacher Participants stated with COVID pandemic affecting so many schools there was nothing preventing streamed sessions but indicated they must be seen to be relevant. Another Teacher Participant stated more pay for teachers for the commitment that they put towards the education of their students was one factor that would help a workforce that feels undervalued, whose professionalism is questioned and whose students can go out into the workplace and be earning more than the teacher within 4 years without a university education doesn't inspire them to stay. Other characteristics that keep teachers in the field include a love of learning, a desire to interact with young people, a desire to contribute to society, and job stability, according to the teacher. Some Teacher Participants would like the opportunity to work together with different departments to find an inquiry based or big ideas project that is meaningful. The Teacher Participants pointed out they would be a reticence to lose their class time but great potential an interest in where it could lead. Being able to work with industry to help develop educational packages that are more relevant to the needs of society was seen by the Teacher Participants as very beneficial, for example working on projects to inspire and problem solve for the community and environment.

The Teacher Participants indicated empowering students to feel they make a difference and to see the impact of their endeavours is crucial. Teacher Participants stated mental health because of social media addiction and bullying is an increasing factor amongst teenagers and this creates huge challenges for education. Social and emotional education is also now taking the place of content as less and less effective social and emotional skills are being learnt at home. Students benefit from social-emotional learning because it teaches them important life skills such as self-awareness, developing a good self-image, taking responsibility for their actions, and forming connections with others. The implications and challenges of the perceived forces of change cited by School C Teacher Participants are summarised in Table 20.

School C Perceived Forces of Change Cited by Teacher Participants
Professional development needed by technology experts for staff and students
Better pay to attract quality teachers and for a workforce that feels undervalued
Opportunity for teachers to work together with different departments … changes to the school day
Mental health because of social media addiction and bullying

Table 20: School C Perceived Forces of Change Cited by Teacher Participants

RQ5: What Might Learning and Teaching Look Like in Schools of the Future?

School A Leadership Participants suggested learning and teaching will be drastically different to what it is now, with their needing to be several adjustments in how we teach and what we teach, an emphasis on skills over content. The Leadership Participants suggested it would be agile, providing multiple opportunities to demonstrate success, reflective to data, personalised, collaborative, evidence of critical and creative thinking and emphasised emotional intelligences. The Leadership Participants suggested with the amount of data that is available, there will be a greater opportunity to use this data in a much more meaningful way, designing a personalised approach with a gap analysis meshed in, may filter down to a closer understanding of what learning looks like for each student.

In School A Teacher Participants stated there would be a greater impetus on inquiry, project-based learning, utilising 21 century skills of communication, collaboration, creativity, critical thinking, and enterprise. Teacher participants suggested predicting the future is difficult but suggested an uptake of appropriate emerging technologies would enable a more personalised teaching and learning style in the next 5 years. However, in terms of 20 years, Teacher Participants indicated there would be more virtual and mixed reality as computing power increased exponentially with the discovery of quantum processors. Teacher Participants questioned, *'will students even need to come to school anymore if a perfectly "real version" can be found on the other side of the virtual reality goggles? and how will teachers who have been teaching for more than 30 years handle such an environment? ... will there be a teaching shortage'?*

School A Teacher Participants agreed that schools are seeing the development of an inquiry-based, problem-based, big ideas approach to learning and teaching, ensuring learning is, authentic based on real world problems or skills.

School B Teacher Participants also stated learning and teaching would be very different. They stated like School A it would be centered on skill development, practical outcomes, based on the needs of the community. The Teacher Participants see pedagogical relationships as not traditional, but rather involve a group of people who work together to achieve a common goal. Together Teacher Participants see the students and the teacher tackle concrete problems with a meeting style that fosters self-learning. Learning to dialogue is both an educational objective and a means of training in the group.

The Leadership Participants see flexible school options for online, face-to-face or a hybrid model of schooling. Flexible start and finish times for staff and students. Online curriculum curators where creative and collaborative curriculum opportunities will become the core function of in-person learning experiences. The Leadership Participants see the school campus becoming more than the building and present opportunities for wider exploration of place and space appropriate to age and stage of students.

The Leadership Participants intimated, schools will become far less governed by the dictates of the traditional timetable suggesting they will be increasing flexibility as to what students can choose to learn in a day, offering far more elective options and different time frames for learning with more project orientation work and fewer handwriting assessments.

One Leadership Participant believed there are many schools already with pockets of teachers where effective pedagogies is occurring now. It can include a variety of methods, such as whole-class and organised group work, guided learning, and individual activities. Effective pedagogies emphasise the development of higher order thinking, creativity, collaboration, communication, and meta-cognition, and they do it through discussion and enquiry.

The Leadership Participant stated schools will still need teachers to form a personal connection with the students, helping to personalise learning, which might look like: 1) recorded lesson content relevant to the teaching happening as it occurs; 2) time provided to students to complete work in commons, that is, they have afternoons to complete the work set instead of 45-minute lessons with students going to see teachers as they require help rather than forcing them to stay in a timetable the whole day; 3) the school day will be more like a university timetable for high school so teachers will need to detach from traditional work hours; 4) Primary school will be largely untouched but be based on local issues (which is already occurring) so teachers will need to teach the skills associated with communication and creatively thinking more explicitly and assess this.

School B Teacher Participants see a solid foundation of literacy and numeracy being built in the early years, developing caring and culturally aware young students, teachers helping middle school students to make connections between their learning in the classroom and the real world. The Teacher Participants see a future pedagogy that builds students' inquiring mindset, fosters their desire to learn, and prepares them to excel at their careers – that may not yet exist! They see the older students combining academic subjects with their own professional interests or passions … where

a goal for future pedagogy for students is one where the students feel they have all the tools and skills they need to lead meaningful lives.

One Teacher Participant indicated micro learning activities and online learning courses will become more common as a tool for enriching and engaging students. The Teacher Participants believe that technology will continue to impact learning and teaching, and the immediacy of knowledge continues to change how and what we do and indicated teachers must work to develop critical thinking skills to allow students to evaluate the knowledge that they have access to at the click of a switch.

School C Leadership Participants saw future learning and teaching catering to each student with a personalised approach using relevant technologies to challenge and improve each student from their current point of knowledge and understanding. The Leadership Participants suggested the role of technology in personalised learning would replace a one-size-fits-all model and would also reduce the administrative burden imposed on teachers which in turn would free them up to focus on the humanistic elements of teaching, and to develop beneficial relationships with students to assist their learning and improve. The Leadership Participants see future education being more preventative through data analytics that will provide early identification and intervention to cater to student areas of weakness. The Leadership Participants stated important implications of the relationship between teacher and students, along with the school community, will see teaching and learning remain on campus and somewhat traditional for the foreseeable future, in my opinion. However, where the leaders thought pedagogy might change is with specialist teachers of a very high standing, being remote from the campus and teaching virtually. These specialist teachers they suggested may work for a variety of schools and on a temporary basis.

School C Leadership Participants stated the pedagogy needs to be adept at meeting the changing demands of the labour market and its needs. This requires education systems to be able to pivot with speed to meet these needs. The Leadership Participants pointed out it would require a triple helix approach to education with respect to schools, employers, and governments to work in collaboration to make sure that education centres at all levels are meeting the demands of the labour market and that government can fund and support these pivots. It will also rely on educators to manage this fast-paced change and themselves pivot to meet the needs of labour markets and understand how the skills they are teaching in a particular faculty area still has relevance in current and emerging labour markets.

School C Teacher Participants saw teachers in providing more personalised learning experiences, focussed on character, with more on educating students on how to find out information rather than rote learn content. The Teacher Participants saw ethical and cultural understandings and the use of data becoming very important in assisting students. The Teacher Participants also saw a more individualised learning approach, which was less directed by timetables and central bodies - shorter lessons - less importance placed on final exams and greater emphasis on assessment for learning - frequent low stakes tests. The Teacher Participants stated with the continued increase in the use of technologies, the changing nature and structure of work and shifting geo-political landscapes and issues of inequality Teacher Participants indicated system and school leaders are more likely to begin to directing resources of the community towards a radically different set of educational futures.

RQ6: How are Schools Preparing Australia Students for Future Environments?

School A Leadership Participants indicated there is a challenge in preparing students for future environment given the unpredictability of the future combined with the cultural conditioning of schools. The Leadership Participants pointed out it is also challenging for teachers to adjust to significant shifts in pedagogical practices as there are emerging requirements for teachers to be data managers and potentially less face to face teachers. This they see as a change from the traditional view of 'teacher'. The Leadership Participants suggested with increasing parents demands, responding to the needs of each individual student, managing, and catering all stakeholders will place an increased amount of pressure for teachers to be able to know, respond to, and plan for all nuanced individual needs. These factors combined with being responsible for keeping up with changes to technologies, questions whether this will place an increased amount of pressure on teachers. Do schools need to shift from the teacher class model to group of educators responsible for the learning, counsel and overseeing personalised learning paths for groups of students? Does such a learning model reflect more of an indicative reflection of the changing world.

School Leadership Participants indicated highly skilled teachers working with students were needed to provide diverse experiences that are connected to industry and teaching valuable life skills, such as: organisation; time management; coping with emotions; critical thinking, creativity, problem solving, communication, cultural diversity. Addressing these skills rather than just teaching content. Teacher Participants in School A stated they are exposing students to a variety of digital contexts explaining there is beginning to be a shift towards preparing students for the future, with a greater emphasis being placed on STEAM subjects, however, this shift is glacial in nature as most schools hang on to 'what is known to work' rather than moving with the future. The Teacher Participants suggested many schools do not have the means (teaching capacity) or funding to facilitate the kind of innovation required for a truly rich STEAM program. They believe providing students with a solid foundation in literacy and numeracy and giving students the opportunity to interact with relevant technology and the real world will be essential in assisting the students to become successful, happy, active and engage citizens.

School B Leadership Participants suggest schools are not preparing are not doing very well at preparing students for future environments as they are bound by federal and state and territory-based curriculum and structures which do not allow change. The

Leadership Participants suggested schools are creating physical and virtual environments more conducive with those of the workplace, such as: flexible learning spaces (physical and digital), online, flipped, hybrid learning environments. Technology is being increasingly integrated into the spaces students use. Conferencing technology, along with other tools is dropping in price dramatically making it easier for students in a range of settings to communicate and share their learning journey.

Leadership Participants also indicated teachers need to be re-educated for future environments first before students can be. Primary schools do an excellent job in early years but as they get older teachers pedagogy changes and become old world, '19th century industrialised' teaching, resulting in environments that promote answering defined, googleable answers, rather than researched considered questions. Leadership Participants suggested Australian schools have a significant aged workforce that do not want to change and therefore do not see the adoption of new ways of thinking. This is partly due to time but also attitude. Students can always be supported by innovative and future focused teachers.

School B Teacher Participants believed Australian schools are constantly reviewing their curriculum and pedagogy to prepare students for future environments, focusing on skill development rather than content, implementing new courses, such as STEAM and social and emotional learning. However, The Teacher Participants suggested they are restricted and limited by old fashioned systems of assessment and examination. One Teacher Participant indicated having worked in the UK the integration of Instructor-Led Training (ILT) for learning and teaching in Australia appears to be far more advanced however, they pointed out ILT has not transferred into assessment practices.

In Schools C, the Leadership Participants indicated they are preparing students for future environments by exposing and upskilling them in future technologies and through a range of life skills to better equip them. The Leadership Participants stated future technologies learning and life skills development opportunities is hampered by a restrictive and standardised curriculum and by federal and state requirements tied to funding, particularly for older students.

The Leadership Participants stated there is already a lot of technology in play at many schools. However, technology use and access are not even across all schools. The technology divide is an equity issue. Senior students are being prepare for future environments by being afforded more autonomy at times and learn in a growing variety of environments, not just a standard classroom. Furthermore, the Leadership Participants cited outside classrooms, learning commons, cafeterias, remotely from home and many more varied learning environments are springing up. Analytic dashboards and the internet are surfacing more and more tailored information to students and teachers.

The Leadership Participants explained schools are catering for these agendas as cocurricular or extracurricular activities and the activities need to be embedded more within the course of a normal school day. They further said the restructure of Year 11 and 12 so that these sorts of projects are not impeded by coursework, assessment and high stakes exams would be a fundamental change. The Leadership Participants suggested more time needs to be created to look at future developments and how they will impact students now and into the future. Accepting change, maintaining effective pedagogies, building resiliency with staff and students' leaders, the Leadership Participants suggested also prepares the students for future environments.

School C Teacher Participants stated in preparing our students for future environments was very piecemeal and relied on the financial support of the school and the drive from the individual teacher. With insufficient training for staff or equitable resources across the schools they suggested preparing our students for future environments was extremely difficult to do. The Teacher Participants explained, teachers need flexible and adaptable learning approaches to better prepare the students for future environment quipped for the changing face of society. Furthermore, Teacher Participants stated currently educators are caught up between what has worked well in the past and what might work well in the future. One Teacher Participant r pointed out some schools are still beholden to their state examinations (e.g., ATAR) and associated parent expectations at the end of year 12. Another Teacher Participant indicated educators need to do better to prepare the students for future environments but saw resistant to change, inequity between high and low socio-economic band schools, and content knowledge vs future skills development needs to be addressed. The Teacher Participants believe after all, research indicates that students quickly forget the material they learned for an exam, and a large portion of what they study today may not be applicable to them in the future. On the other hand, skills are lifelong and may be enhanced and improved over time. The Teacher Participants suggested, in a world where high-level skills are in high demand, the task is to transform traditional schooling models into customised learning systems that identify and develop the talents of all students, and in which school leaders and teachers act as a professional community with the authority to act and have access to effective support systems to assist them in implementing change in what we teach and the way we teach. They also see the challenges facing teachers continuing to intensify. The Teacher Participants believe where the demand for high-level skills continue to grow substantially, they see the task as one of transforming traditional models of schooling into customised learning systems that identify and develop the talents of all students in which school leaders and teachers act as a professional community with the authority to act, and the access to support to assist them in implementing change.

3.4. Questionnaire Two - Teachers Responses: Stages of Concern Data Analysis

School A Data Collection Using the Concerns-Based Adoption Model (CBAM)

In general, School A Teacher Participants had mixed concerns

about the 'forces of change' mentioned, but it would be true to say they were interested in collaborating with other teachers on the following items, programs, practices, or initiatives and sharing how these might impact and help support their teaching and augment student learning. These forces of change included: networked learning and learning societies, automation, artificial intelligence, augmented reality, and gamification.

The Teacher Participants were also interested in learning more about blockchain, mixed reality, and 21st century skills. These would seem to make appropriate school based professional learning opportunities for the teachers. An opportunity to have regular *Genius Hour* sessions to share, collaborate and learn with their colleagues … a great way to get everyone excited about learning, the exchange of ideas and learning from each other's knowledge, experience, and expertise. What follows are the Teacher Participants responses to the individual programs, practices, or initiatives (see Table 21).

School A: Teachers (n=3)		
Item - program, practice, or initiative	**The three respondents *Stages of Concern***	**Explanation**
Hybrid and online education	*6, 3, 6*	Two teacher participants looked forward to sharing ideas about this force of change with other colleagues at their school. One teacher was concerned about how it would impact their school in the future, and the changes they might need to make to their teaching routine.
Networked learning and learning societies	*2, 3, 2*	Two teacher participants wanted to know more about this force of change and one teacher was concerned about how it would impact their school in the future, and the changes they might need to make to their teaching routine.
Teacher meltdown *	*5, 2, 3*	This was not an issue at the school, but one teacher wanted to know more about this issue. One teacher was concerned about how it would impact their school in the future, and the changes they might need to make to their teaching routine. Another teacher wanted to know how it might affect their students.
Anthropocene	*1, 1, 6*	Two teacher participants indicated they were currently unconcerned about this issue with other priorities consuming their time this stage. One teacher wanting to share ideas to other colleagues in the school. The school is already doing work in social justice pedagogies.
Automation	*2, 1, 2*	Two teacher participants indicated they would be interested in knowing more about this force of change and how it might affect their students. However, one teacher indicated they were currently unconcerned about this automation with other priorities consuming their time at this stage.
Artificial intelligence;	*5, 3, 2*	One teacher participant indicated they would be interested in knowing more this artificial intelligence, another how it would affect their students and one teacher was concerned about how it would impact their school in the future, and the changes they might need to make to their teaching routine.
Augmented reality	*6, 1, 2*	One teacher participant indicated they were currently unconcerned about augmented reality with other priorities consuming their time
		this stage. One teacher wanting to learn more about augmented reality and another teacher looking forward to sharing ideas about augmented reality with their colleagues.
Chatbots	*4, 1, 5*	Teachers wanted to know how much time it would take to manage a chatbot, how it would assist their students. One teacher was unconcerned about chatbots with other pressing current priorities consuming their valuable time.
Humanoid robots	*1, 3, 6*	One teacher participant was unconcerned about the significant human impact of humanoid robots, another wanted to learn more about its future impact on their teaching and teaching routine, whereas another teacher wanted to share their thoughts on the force of change.
Holographic teachers	*5, 3, 2*	One teacher participant wanted to know more about this force of change and how it might impact their teaching routine and teaching, and another of how it might affect their student's learning.

Mixed reality	*7, 3, 2*	One teacher participant wanted to learn more about this force of change, with one teacher having ideas on mixed reality that they wanted to share with their colleagues. Another teacher wanted to know how the initiative might affect student learning.
Virtual schooling	*4, 3, 5*	One teacher participant was concerned how it would impact the school and their teaching routine, another two teachers, the time it might take to implement virtual schooling how the experience would affect their students.
21st Century skills	*2, 5, 4*	One teacher participant wanted to learn more about 21st century skills. Another teacher was concerned how 21st century skills would impact the school and their teaching routine. They were concerned about the time it might take to integrate the skills into the curriculum, and its impact on the students learning.
Personalisation of learning	*6, 5, 3*	One teacher participant was concerned how the personalisation of learning might affect the students, another how it might impact their school and their teaching routine and teaching. One teacher was eager to share ideas to colleagues on personalisation of learning.
Blockchain Technology	*2, 3, 5*	One teacher participant wanted to learn more about this force of change, what changes one might need to make to their teaching routine and the affect it might have on their students.
'Big data' collection and learning analytics	*6, 5, 5*	One teacher participant was eager to share ideas on big data collection and learning analytics to other colleagues, whilst two teachers where concerned how it would affect the students.
Gamification	*7, 3, 2*	One teacher participant wanted to learn more about the gamification, with one teacher has ideas on gamification that there wanted to share with their colleagues and how the initiative e might augment the student learning and improve the student outcomes. Another teacher wanted to know how it would impact their school and their teaching routine.
Facial recognition	*7, 3, 5*	One teacher participant had ideas in this area and wanted to share these ideas with their colleagues. Another teacher seemed interested in knowing hoe facial recognition might affect their students and another teacher wanted to and how it might affect their school, its management, classroom routine and its impact on the students.

NOTE: *(I note teacher and student wellbeing, student resilience and mindfulness were issues raised my all-school leaders and teachers and seen as relating to teaching effectiveness and student outcomes).*

Table 21: School A - Teacher Participants Responses to Programs, Practices, or Initiatives

School B Data Collection Using the Concerns-Based Adoption Model (CBAM)

In general, School B Teacher Participants had mixed concerns about the 'forces of change' mentioned, but it would be true to say they were interested in collaborating with other teachers on the following items, programs, practices, or initiatives and sharing how these might impact and help support their teaching and augment student learning. These forces of change included: networked learning and learning societies, automation, chatbots, and gamification. Teacher Participants were also interested in learning more about facial recognition, holographic teachers, humanoid robots, and blockchain technology.

These would seem to make appropriate school based professional learning opportunities for the teachers. An opportunity to have regular *Genius Hour* sessions to share, collaborate and learn with their colleagues … a great way to get everyone excited about learning, the exchange of ideas and learning from each other's knowledge, experience, and expertise. What follows are the Teacher Participants responses to the individual programs, practices, or initiatives (see Table 22).

School B: Teachers (n=3)		
Item - program, practice, or initiative	**The three respondents '*Stages of Concern*'**	**Explanation**
Hybrid and online education	*6*, 5, 7	One teacher participant had ideas about the impact and challenges, and how they could augment their learning and teaching outcomes for students. Another teacher participant looked forward to sharing some ideas about hybrid and online education, whereas another wondered how it might affect their students learning.
Networked learning and learning societies	*2, 3, 2*	Two teacher participants wanted to learn more about networked learning and learning societies, whereas another teacher participant wanted to know how it would impact their school and what changes they might need to make to their teaching routine.
*Teacher meltdown **	*6, 2, 3*	This was not an issue at the school, but one teacher wanted to know more about teacher meltdown. Another teacher participant wanted to know how it might impact on their school in the future, their teaching routine, and the students. One teacher participant also wanted to share their thoughts of this issue with their colleagues.
Anthropocene	*1, 1, 6*	Two teacher participants indicated they were currently unconcerned about anthropocene being concerned with other priorities at this stage. The school is already doing work in social justice pedagogies, with one teacher participant wanting to share ideas to other colleagues in the school.
Automation	*2, 1, 2*	Two teacher participants would be interested in knowing more about this force of change and how it might affect their students. Another teacher participant indicated they were currently unconcerned about automation being concerned with other priorities at this stage.
Artificial intelligence	*5, 5, 6*	One teacher participant was eager to share ideas on artificial intelligence to other colleagues, whereas two other teacher participants were concerned about how it would affect their students.
Augmented reality	*5, 5, 5*	Three teacher participants were concerned how it would affect their students and how it might improve student outcomes.
Chatbots	*1, 3, 2*	One teacher participant was interested in knowing more about this force of change. Another teacher participant wanted to know how it would affect their management and teaching routine and how it might assist their students. One teacher participant indicated they were currently unconcerned about chatbots being consumed with other priorities at this stage.
Humanoid robots	*1, 2, 2*	Two teacher participants would be interested in knowing more about this force of change and how it might affect their students, whereas one teacher participant was not interested in h*umanoid* robots having other pressing priorities.
Holographic teachers	*1, 2, 1*	Two teacher participants were not interested in holographic robots with other pressing priorities consuming their time, whereas one teacher would be interested in knowing more about this force of change and how it might affect their students.
Mixed reality	*1, 5, 6*	One teacher participant was not interested in humanoid robots having other pressing priorities, another teacher was concerned how it would affect the students and how it might improve student outcomes. One teacher participant was keen to collaborate and share ideas on mixed reality.
Virtual schooling	*5, 6, 6*	One teacher participant was concerned how it would affect their students and how it might improve student outcomes. Two teacher participants were keen to collaborate and share ideas on virtual schooling to their colleagues.

21st Century skills	*7, 6, 7*	One teacher participant was very keen to share ideas on 21st Century skills with their colleagues and two other teachers had ideas on how 21st Century skills might impact and challenge student learning and outcomes.
Personalisation of learning	*7, 7, 7*	All three teacher participants were very keen to share ideas on personalisation learning and how this might impact and challenge student learning and outcomes.
Blockchain Technology	*1, 2, 2*	One teacher participant was not interested in blockchain technology with other pressing priorities consuming their time, whereas two teacher participants would be interested in knowing more about this force of change and how it might affect their students.
'Big data' collection and learning analytics	*6, 3, 6*	Two teacher participants are looking forward to sharing some ideas about data collection and learning analytics with their colleagues. One teacher participant wants to know how it would impact their school in the future and what changes might be needed in their teaching routine.
Gamification	*3, 6, 6*	Two teacher participants are looking forward to sharing some ideas about gamification with their colleagues. One teacher wants to know how it would impact their school in the future and what changes might be needed in their teaching routine.
Facial recognition	*1, 5, 2*	One teacher participant was not interested in facial recognition with other pressing priorities consuming their time. Another teacher participant wanted to know more about facial recognition and how it might assist teacher management, whereas another teacher participant wanted to examine the impact it might have on the students.

NOTE: *(I note teacher and student wellbeing, student resilience and mindfulness were issues raised my all-school leaders and teachers and seen as relating to teaching effectiveness and student outcomes).*

Table 22: School B - Teachers' Responses to Programs, Practices, or Initiative

School C Data Collection Using the Concerns-Based Adoption Model (CBAM)

In general, School B Teacher Participants had mixed concerns about the 'forces of change' mentioned, but it would be true to say they were interested in collaborating with other teachers on the following items, programs, practices, or initiatives and sharing how these might impact and help support their teaching and augment student learning. These forces of change included: 21st century skills, the personalisation of learning, mixed reality, virtual schooling, artificial intelligence, and augmented reality. Teacher Participants were also interested in learning more about networked learning and learning societies, anthropocene and blockchain technology.

These would seem to make appropriate school based professional learning opportunities for the teachers. An opportunity to have regular *Genius Hour* sessions to share, collaborate and learn with their colleagues … a great way to get everyone excited about learning, the exchange of ideas and learning from each other's knowledge, experience, and expertise. What follows are the Teacher Participant responses to the individual programs, practices, or initiatives (see Table 23).

School C: Teachers (n=4)		
Item - program, practice, or initiative	**The four respondents *Stages of Concern***	**Explanation**
Hybrid and online education	*5, 6, 5, 6*	Two teacher participants were concerned how it would affect the students and how it might improve student outcomes. Another two teachers were keen to collaborate and share ideas on hybrid and online education
Networked learning and learning societies	*6, 1, 7, 2*	One teacher participant looked forward to sharing ideas on learning network structures and sharing their impact and challenges, and how they could support their learning and the teaching outcomes for their students.

*Teacher meltdown **	*1, 1, 3, 1*	Teacher meltdown was not an issue of concern for three of the teachers at the school indicating they had other priorities to be concerned about. One teacher wanted to know more about teacher meltdown and how it might impact on their school in the near future and the changes they might need to make to their teaching routine.
Anthropocene	*2, 1, 7, 2*	Two teacher participants were interested in knowing more about anthropocene (climate change and other social justice pedagogies) and what it might mean for student learning, with one teacher wanting to share ideas to other colleagues in the school. One teacher participant was too busy at present to be concerned about this force of change given existing priorities for them in the school.
Automation	*7, 1, 7, 5*	Two teacher participants were very keen to share ideas on the impact and challenges of automation and how it could augment their learning and teaching outcomes for students. One teacher wanted to know how automation might affect their students. Another teacher was too busy at present to be concerned about automation given existing priorities for them in the school.
Artificial intelligence	*2, 2, 7, 2*	Three teacher participants would be interested in knowing more about artificial intelligence and how it might affect their students, whereas one teacher wanted to share their ideas and discuss the impact and the challenges of artificial intelligence with other colleagues in the school.
Augmented reality	*7, 1, 7, 2*	One teacher participant would be interested in knowing more about augmented reality and what it might mean for student learning, whereas two teachers wanted to share their ideas and discuss its impact and the challenges of augmented reality with other colleagues in the school. One teacher participant was not interested having other pressing priorities at present.
Chatbots	*6, 1, 7, 1*	Teacher participants feelings were mixed … for two teacher participants it was not an issue of concern for them at school at present, indicating they had other priorities to be concerned about. One teacher participant wanted to know more about chatbots and how it might impact on their school and their students in the future. One teacher participant had ideas about how it could augment teacher learning and teaching management of information for students.
Humanoid robots	*1, 1, 7, 1*	Three teacher participants were unconcerned about the significant human impact of humanoid robots, whereas one teacher participant had ideas about this force of change, its impact and challenges, on the school in the future.
Holographic teachers	*1, 1, 2, 1*	One teacher participant wanted to know more about this force of change and how it might impact their teaching and student learning. Three teachers' participants were busy and were unconcerned about the significant human impact of holographic teachers, given other pressing priorities.
Mixed reality	*6, 1, 7, 2*	One teacher participant wanted to know more about mixed reality in education and what it might mean for student learning, with one teacher participant wanting to share ideas to other colleagues in the school on its impact and the challenges schools face. One teacher was unconcerned about mixed reality.
Virtual schooling	*7, 1, 5, 2*	One teacher participant was too busy to be concerned at present with virtual schooling having at present other pressing priorities. One
		teacher was keen to share their ideas on the impact and challenges of virtual schooling and how it could augment student learning and teaching outcomes for students. One teacher wanted to learn more about the effects of virtual schooling on students.
21st Century skills	*7, 1, 7, 2*	Two teacher participants were very keen to share ideas on the impact and challenges of 21st century leaning skills and how it could augment student learning. One teacher participant wanted to know more about 21st Century skills and one teacher participant suggested they were too busy at present with other priorities.

Personalisation of learning	*7, 2, 4, 2*	One teacher participant was concerned how it would impact on their school, their teaching routine its effect on the students, whereas another teacher was eager to share ideas to colleagues on the impact and challenges of personalisation of learning for students. Two teacher participants wanted to learn a lot more about the personalisation of learning.
Blockchain Technology	*2, 1, 3, 1*	One teacher participant wanted to learn more about blockchain technology, what changes he might need to make to their teaching routine and the affect it might have on their students. Others indicated they currently had other priorities to be concerned with blockchain technology.
'Big data' collection and learning analytics	*4, 2, 2, 2*	Three teacher participants would be interested in knowing much more about *big data collection and learning analytics* and how it might affect their students and what it could mean for their school in the future and the time required of teaches to implement and manage.
Gamification	*7, 1, 7, 1*	Teacher participant feelings were mixed … for some it was not an issue of concern for them at the school indicating they had other priorities to be concerned about. Two teachers on the other hand wanted to share with their colleagues the ideas they have on the impact and challenges gamification could have on teachers teaching and learning outcomes for students.
Facial recognition	*5, 1, 7, 1*	Two teacher participants were not interested in facial recognition, indicating other pressing priorities, whereas the other teachers wanted to know more about facial recognition and how it might assist teacher management and examine the impact it might have on the students. One teacher participant wanted to share with their colleagues' ideas they have on the impact and challenges facial recognition could have on their teaching and learning outcomes for students.

NOTE: *(I note teacher and student wellbeing, student resilience and mindfulness were issues raised my all-school leaders and teachers and seen as relating to teaching effectiveness and student outcomes.*

Table 23: School C - Teacher Participants Responses to Programs, Practices, or Initiatives

4. Conclusion: Research Uncovered, What This Might Mean for WA Schooling.

There is increasing interest in implementing research findings in practice research as findings can influence decisions at many levels - in developing practice guidelines, in developing prevention and promotion strategies, in developing policy, in designing educational programs, in performing educational audit, and in enabling change.

In this strand of the research study Leadership Participants and Teacher participants had an opportunity to reflect upon and examine the implications and challenges of the forces of change as stated in the *Framework for the Emerging Forms of Learning* and discuss their top three issues of concern and their implication and challenges for schools and educators. There are many striking similarities and issues and stages of concern between the three research schools which should be noted. There were also many similarities and participant focus areas between strand one and strand two of the research study (Appendix 5).

The results of the strand two research study have provided an opportunity for dialogue on how to explore and advance the Leadership Participant and Teacher Participants issues and concerns.

The Teacher Participants from the three schools were given an opportunity to highlight their Stages of Concern using the *Concerns-Based Adoption Model* (CBAM), the outcome of which was an option to consider and adopt the three recommendations outlined in the next section.

4.1. Recommendation to Schools Using the Concerns-Based Adoption Model (CBA)

The Teacher Participants Questionnaire responses generated by using the Concerns-based Adoption Model (CBAM) demonstrated its effective use in identifying new ideas, changes, initiatives, resources, and professional learning needed with the schools.

The researcher has made the following recommendations:

1. that the Concerns-Based Adoption Model (CBAM) be used to analyse, explain, evaluate, and monitor the application of a new item, program, practise, or innovation in a school.
2. that the Concerns-Based Adoption Model (CBAM) be used to track how a school is adopting specific reform efforts and changes, and to learn how school leaders and teachers could make sense of the reform initiative(s).
3. that school administrators may wish to collect data using the Concerns-Based Adoption Model (CBAM) to identify what changes to make or what forms of assistance they need, such as extra resources, teacher professional development, or student instruction.

4.2. Considerations When Using the *Concerns-Based Adoption Model* (CBAM)

It is worth noting that if a school was going to personalise and individualise its professional learning for teachers the data collected using the *Concerns-Based Adoption Model* (CBAM) would give a facilitator a lot of information to work with. If teachers are at low levels or stages of concern the first step would be to 'raise awareness'. The professional learning facilitator should think of the training plan as a direct response to the level or stages of concern. For example, a level 6 teacher needs to be provided with 'opportunities to work with other teachers and lead small groups' while someone at level 2 needs sessions with basic definitions and 'how-to' practice.

4.3. Conclusion: The Research Uncovered, its Patterns and What this Might Mean for WA Schooling.

There is increasing interest in implementing research findings in practice research as findings can influence decisions at many levels - in developing practice guidelines, in developing prevention and promotion strategies, in developing policy, in designing educational programs, in performing educational audit, and in enabling change.

In this strand of the research study school leaders and teachers had an opportunity to reflect upon and examine the implications and challenges of the forces of change as stated in the *Framework for the Emerging Forms of Learning* and discuss their top three issues of concern and their implication and challenges for schools and educators. There are many striking similarities and issues and stages of concern between the three research schools which should be noted. There were also many similarities between strand one of this research study and its strand two. Strand one, had two participant groups: 1) an expert panel of seven educational leaders; 2) fifty-five system and school leaders across the three Australian education sector/systems. The similarities included:

- The need and time required for the ongoing professional development of staff in emerging technologies and how that might be best used to augment student learning to meet educational goals
- The need to discuss teacher shortages, parental and community expectations of teachers, and to attract and maintain quality teachers
- The need to address staff and student mental health and wellbeing, bullying and social media addiction and abuse
- The value of the school but participant agreement that things must change to meet the future needs of the students
- Acknowledgment that the curriculum is overcrowded, and the modes of learning and teaching methods are outdated
- A movement away from a content driven curriculum to skill-based learning to better prepare our students to be future ready
- Wealth disparity between schools and its impact on children's education needs to be addressed
- for the continuous training of staff and students in emerging technologies and how best to use them to enhance student learning to achieve educational objectives
- to recruit and retain competent teachers
- to maintain mutual parental and community expectations of teachers

The schools also were able to explain how they are preparing their students for future environments and what they think learning and teaching might look like in schools of the future. There are also striking similarities between the participating schools. These include the need:

- to build staff and student resilience
- empower staff and students to proactively manage and improve their mental health and wellbeing
- for equity in education to guarantee that every students receive the resources and support they need to succeed in realising their full potential as learners
- for a gradual movement away from a content-based learning to skills-based learning
- to accept and acknowledge that change is possible and needed
- for a movement to a personalised learning approach aided by sophisticated technology to support the pursuit of knowledge to meet the individual needs of its students.
- for school leaders and teachers to be future focused to prepare students to be future ready.

What does this mean for schooling? The findings of the research study will provide an opportunity for dialogue on how to explore and advance the leaders and teachers issues and concerns.

The teachers from the three schools were given an opportunity to highlight their Stages of Concern using the *Concerns-Based Adoption Model* (CBAM), the outcome of which was an option to consider and adopt three key recommendations [10].

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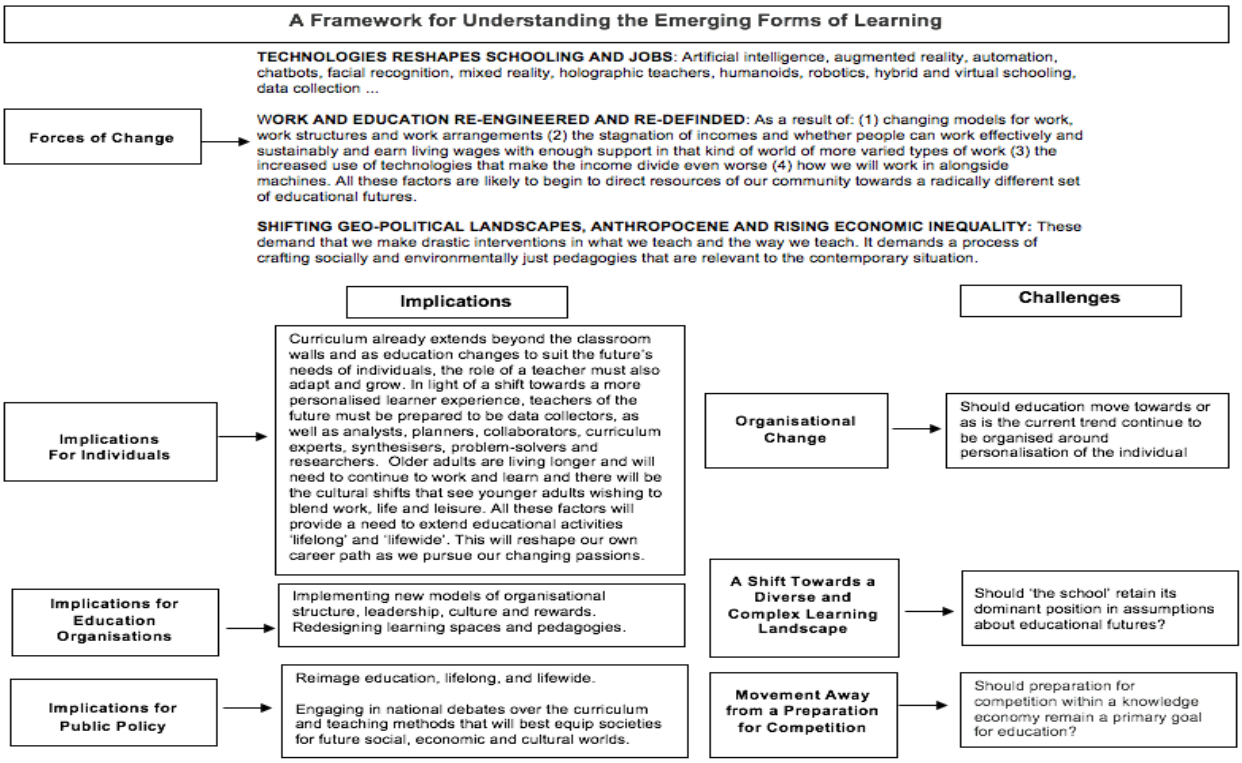


Appendix 1: "Forces of Change": A Framework for Understanding the Emerging Forms of Learning

School	Top 3 Issues	Impact Issue 1	Impact Issue 2	Impact Issue 3	Resources needed to address the issues	If the resources are not available, what can a school leader do?
School A: School Leaders	1. Staffing 2. Student needs 3. Parenting in a digital age	**Staffing:** Quality teachers make an enormous difference to the lives of our children. The ability to develop, retain and develop teachers remains a top priority.	**Student needs**: We have seen more recently an increasing number of students with specific learning needs and disabilities enrol in schools. With higher levels of needs, schools will be stretched in terms of their ability to cater for an ever-increasing range of needs.	**Parenting in a digital world**: Schools will need to continue to work with parents to promote the vital role they play in a digital world. With all the distractions and temptations, the digital landscape includes, it is vital that the recognition of what a parent does is crucial to the formative years of their child. Reading, playing and time with the child will become more important than interacting with the 'digital baby-sitter' (iPad, X-box, PlayStation etc).	Time, specific budgets, and staff. Information sessions for parents and the community.	Be active in opening the debate for change within their school. Involve parents and staff in implementing change.
	1. Expanding skillset required of teachers 2. Equity - socio economic divide between schools and subsequent opportunities. 3. Automated personalised learning, the role of the teacher comes into question.	**Expanding skillset**: Teachers will rely upon the skillset of other teachers to get them up to speed with innovative changes, increasing pressure on those who have a solid understanding of platforms or technical interfaces.	**Equity divide:** an impact upon employment opportunities, and the impact on students. Students who have access to personalised and well resources learning could have access to greater tertiary experiences, and subsequent employment.	**Automated personalised learning**: Teachers feeling of self-worth and adding to pressure to know each student personalised learning journey. Teachers needing to develop a skillset that supports the students with their personalised learning.	:	Provide collaborative working spaces and systems so that knowledge and skills can be shared amongst colleagues. Provide time to share and support skill development within frameworks. Regular check ins, guided PL to support school objectives, peer sharing of successes and 'tips' for platforms. Opportunities for teachers to share their 'I am having trouble with...'. Leaders face the responsibility to set up support and guide teachers through transitions to new and innovative systems or pedagogical approaches. Without leaders being there to support, uptake of innovation can be slow, burdensome and impact morale.
	1. Lack of Vision 2. Constant Change 3. Resourcing - cost, time, workload, uncertainty	**Lack of Vision:** Those who have been around the industry have noticed several 'cycles'. There has been change for change's sake, jumping on bandwagons, bells & whistles, or back to things already done. This can lead to cynics who are reluctant to change as it is the 'same old' same old' … or can see that if they do change and invest, the efforts would be wasted as things will simply change again... or effort put in may not equate to benefits in student outcomes. The reluctance to change could also be there, despite the change having positive affect to student outcomes, but because of the similarity with a previous innovation,	**Constant Change**: Teachers already have workload issues. Schools also have limited budgets. Any change requires resourcing, but may not be easily available due to competing priorities, dwindling income etc. Things are changing all the time, but also the frequency of change is increasing. We don't know what's coming around the corner. It makes it difficult to plan, or to say that any strategy developed is the right one. Some trends are so new, there are little or no guides that we can learn from, compared to previous issues where we had other countries to learn from.	**Resourcing**: Teachers feeling of self-worth and adding to pressure to know each student personalised learning journey. Teachers needing to develop a skillset that supports / students with their personalised learning.	Time Money -->cover relief staff for PD, PD itself, purchase resources. Human Resource --> succession planning so that it remains sustainable if key drivers leave and buy-in from staff.	Do the best we can to support staff, to seek alternative solutions that can head towards the intended goal.

		the hesitation persists.				
School	**Top 3 Issues**	**Impact Issue 1**	**Impact Issue 2**	**Impact Issue 3**	**Resources needed to address the issues**	**If the resources are not available, what can a school leader do?**
School B School Leaders	1. Materialism 2. Individualism Issue 3. Separation of Science and Religion	**Materialism**: This affects students and the working relationships with colleagues because at the end of the day people are concerned with making enough money to survive in this materialistic world. Contentment doesn't exist. Students are looking for the best mark to get them into the best university to get them the best job to get the most money. This is what drives them and any change to this process is met with challenges and resistance.	**Individualism:** This affects students and working relationships in a similar way to materialism. Teachers don't want to be singled out as making mistakes or performing well enough, everyone wants to be the best. Students are competing against one another for the best marks. Systems change and innovation comes from collaboration and working together. At the moment the education system does not promote this.	**The separation of science and religion:** This has a huge impact as education is currently focussed only on the material side of life, knowledge of the sciences. There are very few educational systems that also look at the development of spiritual qualities such as kindness, generosity, justice and expressing these through service to others.	Engagement of the community, the universities to make changes that allow schools to make changes.	Encourage professional learning communities and network societies that can engage in conversations around these issues and consider ways to make change.
	1. Changing perception of digital pedagogy 2. Creating flexibility in schools for staff and students (time, place, pathways). 3. Changing the narrative on measures of success.	**Changing perception of digital pedagogy**: This means changing perception of digital pedagogy and developing teaching understanding of the need for digital literacy and digital citizenship as a priority in education. It also includes developing teacher confidence and competence to implement as part of everyday learning. Redefining the importance of digital literacy and citizenship and prioritising its place in the curriculum will be a key factor in encouraging staff to embrace professional learning in this area. Highlighting agency, equity, access, and capacity should propel this agenda. Students are already charging ahead of their teachers in the digital landscape, so space needs to be created for teachers to be able to develop professionally in this area through a variety of online, face-to-face, and self-initiated means.	**Creating flexibility in schools for staff and students**: This means providing the opportunity for educational experiences (regardless of geographic location or time), support personalisation for the learner and capacity to develop agency in learning both within and outside the classroom walls. Therefore, personalising the learning journey and nurturing an environment conducive to developing self-efficacy and self-awareness. The use of digital devices gives rise to transforming possibilities rather than substituting traditional schooling practices. Opening possibilities to attend on-demand classes (online or in-person) would motivate students to develop their passions and design learning experiences with a multitude of tools accessible for individual learning needs and level the playing field for equitable access.	**Changing the narrative on measures of success** (e.g., ATAR, WACE): The options and possibilities open to students through technologies allow for meaningful and authentic transformation of learning through freedom of movement and freedom of expression through the multitude of tools and platforms available. Students are empowered to design their own pathways through creative immersion and a multi-skilled approach to learning, therefore, measures of success do not become dependent on scores but rather on contribution, wider-participation, evidence, and portfolio.	Leadership in digital learning and pedagogy (not technology specialists). Curriculum strategists - future of work, future of schooling, future of curriculum. Parent and teacher education - confidence and competence in digital literacy and digital citizenship.	Create roles for staff in key areas. Explore best practice models and develop long-term strategy. Create certification models/expectations for staff in digital learning.

	1. The type of training and selection of new graduates as they enter the field of education. It needs to be radically overhauled. 2. The pace of change that is overwhelming for educators 3. Innovation that is introduced without a careful assessment of its impacts.	**Overhauling graduate teacher training:** A teacher needs to have of a certain disposition to succeed as an educator. They need to be committed to constantly learning new things. Their specialised area of expertise is important however they must be creative, open flexible and tech savvy in working with colleagues in a range of educational setting. Having content knowledge in an area is only one minor part of the picture now.	**The pace of change:** When introducing any new system change, an understanding of the context and culture of the organisation must be assessed carefully before it is introduced, otherwise staff become fatigued and reticent to change anything. Too much cognitive load on educators leads to a lack of willingness to change and adapt.	**Careful assess the impact of proposed change/s**: Too often a new technological innovation may present the organisation with real benefits but add another layer of complication to the running of the organisation. As technology often leads schools become increasingly more complicated and attempt to 'maximise' outcomes and drive towards greater 'efficiency', students and staff feel the increasing pressure that can ultimately inhibit learning.	On the job mentorship and leadership training in systems level decision making and change management.	Create roles for staff and use these in-house staff to help with change at your school. They should be able to help others identify the need for change, form a change network, communicate effectively, and be prepared for opposition. They should also be able to track progress and celebrate triumphs.
	1. Teacher training - Many teachers are still teaching with the same pedagogues and substituting technology rather than enhancing lessons with technology. 2. Skills based teaching 3. Testing does not reflect real world and therefore is a function that is outdated and not relevant for future.	**Teacher training in technology integration:** Teachers that think they have a method for teaching that does not include new technologies and still get good marks will be an issue. This causes tension between what we believe the aim of schooling is. We also have this reenforced by the notion of testing content and grades which is currently seen as the only defined goal of schooling and the ultimate measure of success.	**Skills based teaching**: Many teachers don't understand skills-based education as it is not something they have learnt when they trained as a teacher. The explicit teaching of a skill is not something students can google or explicitly look up. It is something that is practiced, therefore is hard, and it is seen by many teachers as contributing to a sound education in the traditional sense, devaluing this Skill based learning is essential for students to become success, engage citizens in the future.	**Issue 3** Testing is loved by some and hated by majority. Formal one of testing removed will be welcomed by all for assessing one's ability to study a subject	• Forced retraining of staff - unfortunately some teachers never undertake adequate Professional Development is vital for learning new pedagogies of digital technologies. The world moves and they don't so forced training is the only perspective that can work for some. • Add into degree a more generic number of units aimed at teaching skills that schools need t but also those teachers want to see in their students. Teachers need to be training to teach skills and how to teach skills within their areas explicitly not implicitly • Government direction on testing will solve this.	Time is the biggest issue for retraining. Lack of trainers for skills based explicit teaching but also for technology integration. These are hard to find.
School	**Top 3 Issues**	**Impact Issue 1**	**Impact Issue 2**	**Impact Issue 3**	**Resources needed to address the issues**	**If the resources are not available, what can a school leader do?**
School C School Leaders	**1.** ATAR focus **2.** Complexity of moving all schools\teachers together 3. Change management requires willing staff that are not overly time-poor	Using a portfolio entrance approach to university will de-power the ATAR and allow for reform\innovation more quickly. It may or may not result in academic rigour.	**The c**omplexity of moving all schools\teachers together. The drivers for change need to be sufficient to give schools\teachers a compelling reason to change\innovate.	Change management requires willing staff. Teachers are under-valued and under-paid. They are also relatively time poor during Term time and struggle to find time to do genuine, worthwhile professional learning. Schools don't invest enough in professional learning and make it attractive and accessible.	Better remuneration for teachers and less stress. Schools need to invest more in innovative and technological minded senior staff. These staff can role model and inspire other staff, plus provide the professional learning opportunities. Senior management staff can encourage teamwork and positive connections between staff and increased productivity and creativity, as well as improved levels of engagement and retention. These are all benefits of having a supportive culture and innovative and technological minded senior staff.	Attempt to inspire and encourage from the top down but it comes at a significant risk if resources are limited.

	1. Educators who are reluctant or don't see the need to change or innovate. 2. Lack of external incentives to change e.g., ATAR scores promoting an existing successful system. 3. Lack of initiative or change from Government and Curriculum Authorities to drive innovation and change at school level.	**Educators reluctant to change:** The impact is an increased or perceived increase in workload and upskilling by fellow educators. The impact for students is that they are not receiving a relevant education that meets the needs of today and this may be disadvantaging them from other students.	**Lack of incentives to change**: Currently the content, ATAR and grading provides an established system that is known well by educators and students. If this were to change it would provide uncertainty for both groups and for tertiary education institutions that use this method for enrolment. Change that incorporates new assessments to give vital information on the development of critical abilities, commonly referred to as 21st century skills, can, on the other hand, allow greater flexibility and freedom in the way students learn and are recognised for their accomplishments.	**Lack of initiative or change from Government and Curriculum Authorities**: This has an impact as it does not provide the incentive for schools and educators to drive change at a classroom level. If this were to change it would provide an impetus for all relevant stakeholders to move in the direction to make meaningful change. Without this directive from the top down it is difficult to have systemic change.	A mandate for change that pushes all the way to students without having the outcomes diluted. This includes changes to existing policy and pathways to open opportunities for more flexibility and freedom of learning and teaching. This in turn increases the workload for educators and hence requires additional resourcing in labour and support of these educators to implement meaningful and long-lasting change.	If the resources are limited a school leader can look for small opportunities to implement some of the changes and prioritise where possible. They can start making small changes in culture that can then grow, with the messaging and actions that this change is important to students and educators is a vital element of this change. Not all innovation and change require large resources, so look for the easy to implement opportunities to drive the early shift and case for change.
	1. Hanging onto an outmoded forms to measure school success (e.g., ATAR). VET also needs to be considered an equal not a poor cousin. 2. The pace of change and the ability to pivot at a system level. A radical shift needs to occur at the speed at which change can be made to meet the needs of a rapidly changing world. 3. Being adept at updating technical skills and human skills.	**Hanging onto an outmoded forms to measure school success**: This is a monumental national shift and there would be a significant amount of fear from staff about this change. I believe that students would be able to manage the situation better and would potentially thrive without high stakes testing and examining hanging over them. Measures to change the transition from school to university would be quite easy, such as the entry mechanisms in place at the University of Western Sydney. The Chancellor Peter Shergold suggested working relationships would potentially become strained as positions may become redundant and people would be scrambling to justify their positions, particularly in high achieving academic schools.	**The pace of change and the ability to pivot at a system level**: The pace of change is something that schools have not had to manage to a high degree. The methodologies within schools have been the same or similar for the last 100 years. changes that happen at a rapid pace and the personal skills that affect all in their journey through life. Mental health has become a much more significant issue within society as one example. Breaking stereotypes, labelling and unconscious bias can only assist in developing how we engage with 'other' and how we perceive 'self'. Staff in schools would struggle to deal with a complete pivot if required to meet the needs of the labour market. It would also require teaching staff to have a much wider repertoire of skills to discuss how the world works and how to work within it to deliver to students the necessary understanding outside the current setting.	**Being adept at updating technical skills and human skills**: This is a continual learning experience that can be affected by the changes within society. Removing stereotypes, labelling and unconscious bias can be difficult due to ingrained habits of colleagues and students alike. Mental health has become a much more significant issue within society as one example. Breaking stereotypes, labelling and unconscious bias can only assist in developing how we engage with 'other' and how we perceive 'self'.	Time and good professional development and ongoing training that addresses the constant change that all members of society are dealing with.	A school leader needs to first understand the context and shifts within society at large and be able to see where and how these may affect a school. An underdeveloped resource is the staff within schools who have an array of abilities and talents that could be used to deliver meaningful professional development if they were given the time to do so. Also selecting a theme for professional development that will have genuine impact within a school rather than the adhoc professional development that I have experienced over my career.

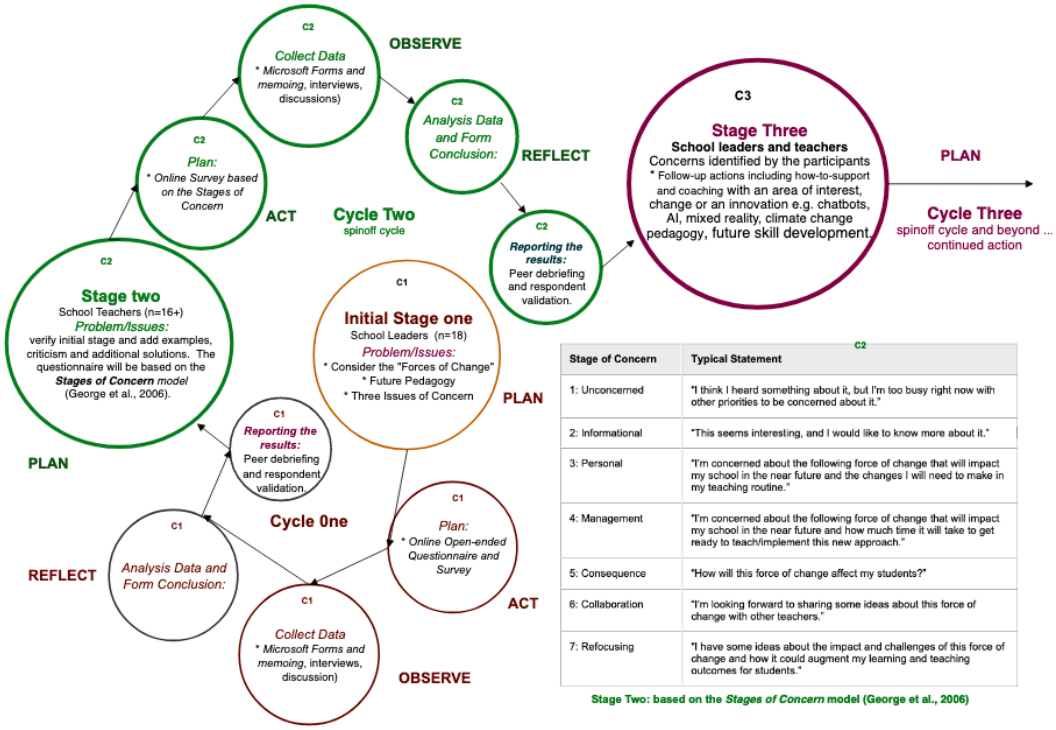
School A: Teachers	**Top perceived issues of concern:** 1. Teacher workload 2. Insufficient parenting, prevalence of mental health and learning difficulties amongst students 3. Over-crowded curriculum 4. Focus on knowledge regurgitation rather than application of skills. 5. Over-assessing students to appease parents. 6. Economic inequality, society's negative view of the teaching profession and teacher retention	**Resources needed to address the issues:** • Smaller class sizes and more support staff, mandated parenting classes • A dramatic reimagining of the Australian Curriculum that gives teachers the breathing space to create programs that aren't so content driven, but rather operate with the idea that you are preparing students for the future through arming them with a range of applicable skills • Students are told what to learn, when to learn it, how to learn it, and given a deadline. There isn't the freedom for imagination and creativity that young people are so blessed to have. Through this spoon-feeding to regurgitation, the students aren't encouraged to challenge the status quo, dig deeply into topics, consider historical context or future application or concepts - but rather repeat back what they have been told. With a change in focus by administration and professional development of teachers in how to maximise a child's potential, a significant change can be made • Assessment needs to have a fundamental shift from summative to formative focus. There is too much reliance and emphasis placed on scores, ranking and comparative data, rather than the progress and journey of the specific child. These scores, however, area a tangible tracker for parents who love to know how their child is doing in relation to others. I believe educating parents as to how to track (and celebrate) progress, rather than percentages, is crucial • Higher entry standards to teacher training • An increase in teacher numbers to reduce class sizes	**If the resources are not available, what can a school leader do?** • Try to support students emotionally while managing classroom teaching and administrative tasks • Explore different opportunities for cross-curricular teaching to take time pressure off the teaching and still cover everything required by the curriculum • Develop cross-curricular projects where students could access their favourite area to study, while still being supported and extended. Also, including more topics like philosophy to encourage discussion, deep thinking, and broad consideration of new ideas • Develop rubrics that show the abilities - in line with Judging standards - in a clear manner, rather than a score which indicates very little. Encourage moderation of assessments with rubrics to develop a consistent approach and increase the validity of the rubric.
School B: Teachers	**Top perceived issues of concern:** 1. Schools being driven by NAPLAN, My School and ATAR rating rather than a balanced holistic approach 2. Teachers drowning in paperwork and being available to parents via email constantly, so time is spent on paperwork/ administration rather than teaching and learning programmes 3. The organisations/ people driving the change have not been in a classroom setting for many years. Students and current teachers should be part of this drive for future change 4. Social Media, Tech Addiction, Mental Health 5. Socio-economic disparities between educational sections/schools 6. Increasing impact of technology on students' capacity to concentrate, memorise 7. The disconnect between future education and old-fashioned forms of assessment	**Resources needed to address the issues:** • School Leadership/ Council/ Admin pushing for holistic balanced approach • School leadership with cultural change with parents to allow time for quality teaching and learning • Government acknowledging that the current system is future flawed and using current teachers and current school leaders to guide and develop the future framework. • The teaching profession needs to be valued more in society, and it needs to attract more intelligent and capable people into the profession • Governments, universities, schools, and researchers need to collaborate to consider the future of assessment and how best to measure student learning and attainment.	**If the resources are not available, what can a school leader do?** • Work to improve my own classroom practice - and lobby to the leadership and council of the school to look to future ready programmes. • Bring education to the forefront of politics and media. • This will be a seismic shift; however, it is critical if schools are to move with these forces of change. Otherwise, they will continue to be restricted to preparing students for assessments and exams rather than skill development and preparation for the future.

School C: Teachers	Top perceived issues of concern:	Resources needed to address the issues:	If the resources are not available, what can a school leader do?
	1. There is a disconnect between the government who needs to stay in power, what industry wants, what universities are funded for and what schools are funded for and can deliver. 2. Moving away from the WACE/ATAR, value adding to information to make it knowledge and hopefully wisdom. 3. Emotional intelligence and socialisation are going to be very important too. 4. Need for balance between fundamental skills e.g., mathematics facts and real world/project based/individualised learning 5. Technology - students can learn, students can be distracted, students don't understand what they are learning 6. Potential disconnects … what are the jobs of the future and how do schools prepare their students.	• Education and professional development of staff, especially the decision makers at all levels of government and school administration. • Clarity of thinking from people in positions of power - consensus between universities, schools, and government as to what are the most important skills for students to learn at school • Continue to lift teaching standards.	• It then once more falls on the individual teacher to make a difference, by spending their time keeping up to date with relevant technology. • Trying to integrate technology into the curriculum and producing meaningful projects that question what is around them; ask ethically questions both of society and the environment; encourage innovation that is based around observation, need and a social conscience.

Appendix 2: Issues Concerning Systems Change or Innovation that Education Face Today, and Resourcing

Stage of Concern	Typical Statement
1: Unconcerned	"I think I heard something about it, but I'm too busy right now with other priorities to be concerned about it."
2: Informational	"This seems interesting, and I would like to know more about it."
3: Personal	"I'm concerned about the following force of change that will impact my school in the near future and the changes I will need to make in my teaching routine."
4: Management	"I'm concerned about the following force of change that will impact my school in the near future and how much time it will take to get ready to teach/implement this new approach."
5: Consequence	"How will this force of change affect my students?"
6: Collaboration	"I'm looking forward to sharing some ideas about this force of change with other teachers."
7: Refocusing	"I have some ideas about the impact and challenges of this force of change and how it could augment my learning and teaching outcomes for students."

Appendix 3: Adapted from the Stage of Concern Model George, Hall & Stiegelbauer (2006) [9]



Appendix 4: Strand Two - Participatory Action Research Process

Two Perspectives	**Concepts**	FINDINGS: **Similarities Participants articulated …**	FINDINGS: **Focus Participants focus areas…**
STRAND ONE: *The Scenarios of Future Schooling, Futures Thinking.* **The macro:** the big picture.	The macro examined the overall picture: • what will schooling look like in the future? • will the notion of 'the school' still exist as we know it? • what is the value of scenario analysis and futures thinking in aiding educational change into the future to equip students to live and work successfully in the 21st century.	**Strand 1 and Strand 2** ▪ A need for a whole child approach to learning, which focuses on the bigger picture. ▪ the need to build staff and student resilience and health and wellbeing ▪ the need for equity ▪ an understanding of the impact and challenges of the emerging technologies on education ▪ the anthropocene era which requires the need to teach 'socially and environmentally just pedagogies' ▪ the impact and challenges of the changing nature of work ▪ teacher meltdown and shortages, and the need for improved teacher support and training ▪ acknowledged the important of schools being future focused, preparing students to be future ready.	**In Strand 1 Participants saw:** ▪ that change was possible and needed ▪ the value of futures thinking, and scenario analysis in assisting education system change in an age of disruptive technologies ▪ the importance of 'the school' as places of community and belonging
STRAND TWO: *The Emerging Forms of Learning, Future Skills.* **The micro:** the fine-grained methods and practice of learning and teaching (the pedagogy) and the future skills required.	The micro explored: • what are the perceived 'forces of change' impacting education? • what will learning and teaching look like in the future? • what skills will be required of students in the future?		**In Strand 2 Participants emphasised:** ▪ future skills: 6Cs ▪ personalisation of education

Appendix 5: Strand One and Two Similarities and Participant Focus Areas