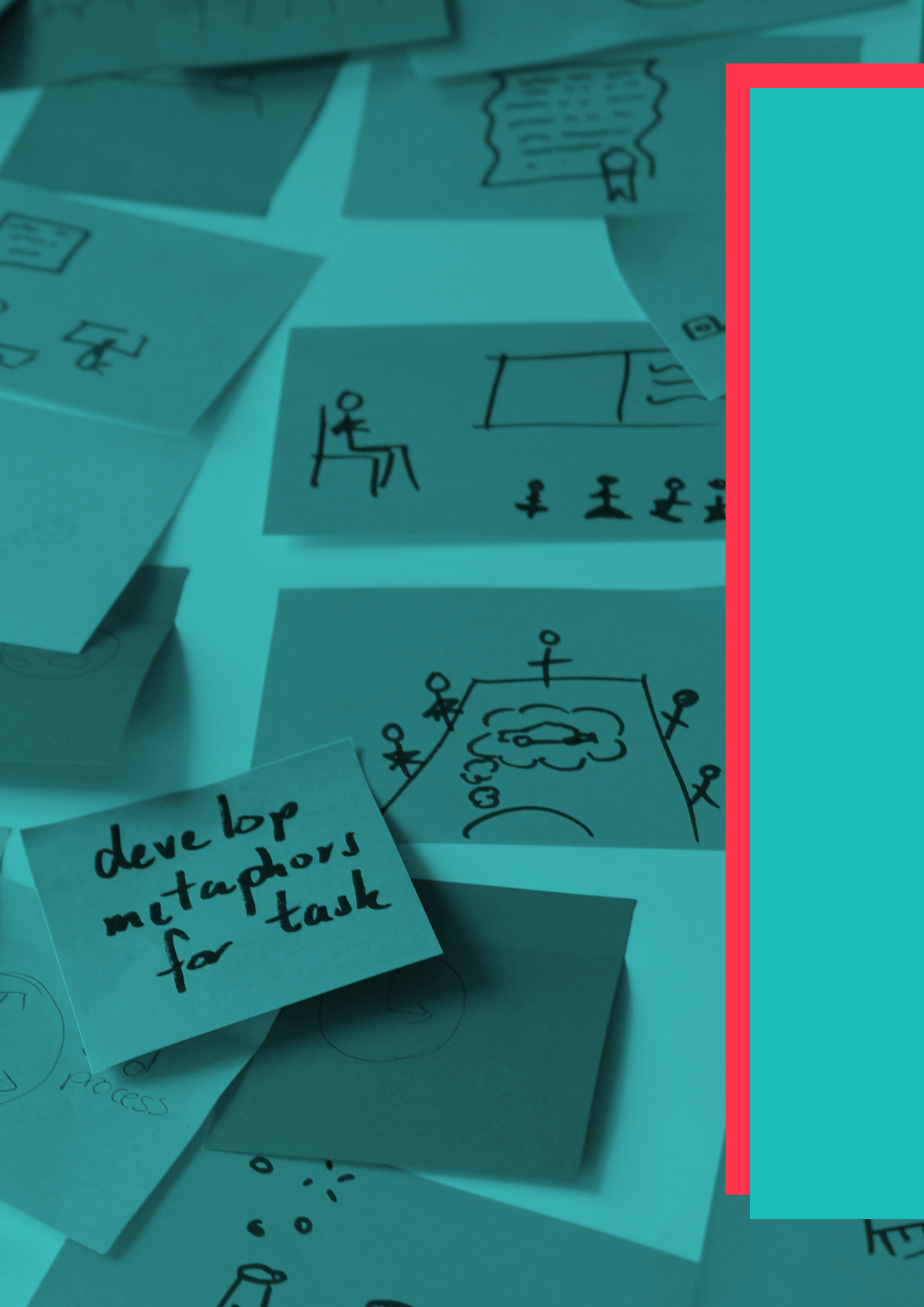


# Design thinking for learning (DT4L)

## School case studies



develop metaphors for task

process

# Contents

<b>Introduction</b> .....	5
<b>CHRISTIAN COLLEGE GEELONG</b> .....	6
Design thinking in the school's context .....	7
How was design thinking implemented, and what learnings eventuated in each design thinking stage? .....	8
What are the challenges and characteristics of an effective design thinking curriculum? .....	11
How has DT4L impacted students, teachers and the school in the mid to long-term? .....	12
<b>WESTBOURNE GRAMMAR SCHOOL</b> .....	14
Design thinking in the school's context .....	15
How was design thinking implemented, and what learnings eventuated in each design thinking stage? .....	16
What are the challenges and characteristics of an effective design thinking curriculum? .....	17
How has DT4L impacted students, teachers and the school in the mid to long-term? .....	18
<b>KILVINGTON GRAMMAR SCHOOL</b> .....	20
Design thinking in the school's context .....	22
How was design thinking implemented, and what learnings eventuated in each design thinking stage? .....	23
What are the challenges and characteristics of an effective design thinking curriculum? .....	25
How has DT4L impacted students, teachers and the school in the mid to long-term? .....	26
<b>Conclusion</b> .....	28
<b>Appendices</b> .....	30
Appendix 1: Participating schools .....	31
Appendix 2: Project outline for teachers (Kilvington Grammar School) .....	32



# Introduction



The Design Thinking 4 Learning (DT4L) program was an innovative, co-designed initiative by Independent Schools Victoria (ISV) and NoTosh to explore design thinking as a model of inquiry and to promote more open-ended student-led learning. A total of 23 schools have participated in the program since 2017.

ISV employed a mixed-methods research design to understand participants' experience of the project and to evaluate the program's outcomes and impact. Quantitative online surveys and case study interviews were adopted to address the evaluation objectives.

The main purpose of the case study research was to explore design thinking in action and to paint a holistic picture of the design thinking elements, including its challenges and impact. The DT4L project was unique in each school with specific learning intentions, settings and outcomes. ISV gathered qualitative data in the form of interviews, both during and after the project's implementation, to explore and analyse the experiences within and across schools. Participating schools were Christian College Geelong, Westbourne Grammar School and Kilvington Grammar School.

The following section explores the DT4L project in each case study school, including how design thinking was introduced and implemented, the perceived challenges and implications, and the learning outcomes throughout the design thinking process.



# Christian College Geelong



# Design thinking in the school's context

Christian College Geelong participated in the DT4L project 2017. The project had a direct link to two of its strategic goals:

- building capacity of students to learn
- producing quality, effective teachers and teaching.

The school aimed to adjust, change and plan its teaching and learning program in line with twenty-first century education, recognising it is preparing its students for a very different future. Teaching staff displayed varying and mixed understanding of what this entails. One of the reasons for their participation in the DT4L project was to bring a common process that has been trialled and tested to sharpen their focus. The school recognised a need to have targeted professional learning and to empower its staff to build a modern curriculum in line with learning skills for the future.

The school has introduced the Building Learning Power (BLP) approach which aims to help students become better learners and prepare them for lifelong learning. The DT4L project aimed to supplement and build upon the learning dispositions through the BLP project and become the missing 'model' to support the inquiry learning process. A problem-based learning focus such as design thinking was seen as an ideal fit and highly relevant to the next step of the school's strategic direction.

The school had a very specific focus to integrate design thinking in the school's context. The design thinking project was planned to be the 'prototype' in its Year 7 'save our water' unit, which was part of the school's bigger theme of sustainability. This inquiry-based unit was introduced in 2016, however the school found that students did not have a shared common understanding of the inquiry process, or the language and key facets of the design thinking model. The school considered the process of design thinking as an option to develop a shared view around inquiry for students.

Integrating design thinking as part of its sustainability approach was an intended effort to break down silos and create real sense and meaning for students' learning experiences. The introduction of design thinking through sustainability was seen as a good entry point before rolling out design thinking in the junior, middle and senior schools, and across interdisciplinary units of study. The school believed that design thinking is a tangible process that teachers can integrate into the timetable or curriculum that is more substantial than just students and teachers using a new language.



# How was design thinking implemented, and what learnings eventuated in each design thinking stage?

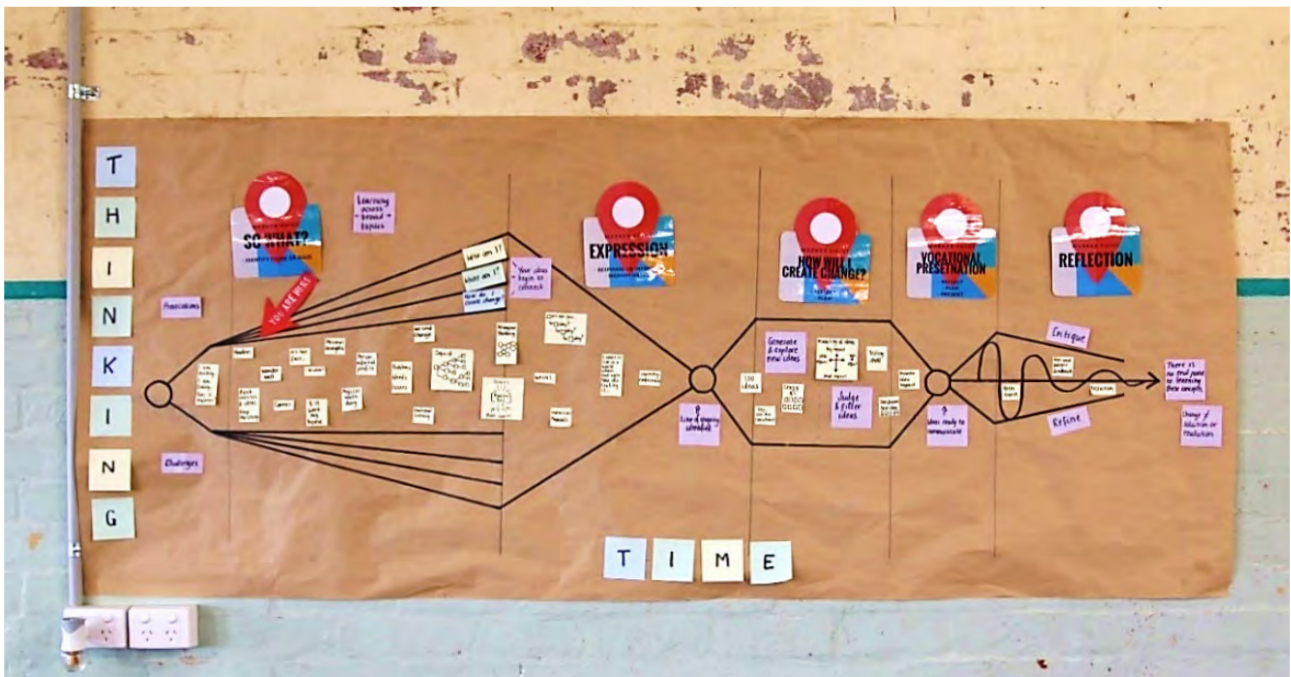


Image 1: The design thinking process at Christian College Geelong.

Five teachers were selected to participate in the two-day DT4L incubator workshop at Independent Schools Victoria. These teachers were either Year 7 or Year 8 teachers. They met up virtually once a fortnight after the incubator sessions through a series of video conferences to continue their discussion. As part of the DT4L project, the school also had on-site coaching and mentoring facilitated by NoTosh which helped staff to strategise ways around using design thinking routines and tasks. The professional learning time was considered valuable as teachers across different campuses gathered to plan.

Shutting down the timetable for two weeks with their Year 7 students meant that teachers were able to teach design thinking as a sequential framework and for students to immerse in each stage of the design thinking process. The project started with an introduction to the design thinking process and an explanation of each stage from immersion to feedforward, as detailed in Image 1 (p.8).

In the immersion stage, students were asked to define sustainability and brainstorm relevant issues. Students explored the United Nation's 17 Sustainable Development Goals and were able to choose one that resonated with them.



*“Design thinking has the potential to provide an innovative learning environment that supports a culture of collaboration and growth.”*

Students were taught about finite resources using activity-based learning to deepen their understanding of sustainability. They were divided into groups: the first group was asked to create a building using a set of Lego blocks, and the second group used the remaining blocks to create a similar building. The school also partnered with six local businesses including the Salvation Army and Cotton On, where stakeholders from each organisation briefed students on sustainability problems in their industry. This enabled students to further identify the project with real-world issues that were prevalent in their neighbourhood.

During the synthesis stage, students demonstrated a stronger understanding of discoveries in their learning and started to make and unpack connections. Students worked together in theming their thoughts and ideas gathered in the immersion stage.

Hexagonal thinking was used in this stage to map out the information in a way that conveyed complex connections between ideas, concepts and facts. The process of connecting the pieces of information (as students swapped the information pieces in and out) enabled them to ‘think aloud’.

The ideation stage was reported to be the most enjoyable design thinking stage among students. In this stage, students were asked to create a library of different ideas using short rounds of open thinking and sharing. Students embraced the idea of ‘failing’ as teachers encouraged them to put forward their ideas regardless of how wild they seemed. Teachers reported that students began to generate multiple ideas to open-ended problems (using divergent thinking) and to elaborate on their ideas.



**Image 2: Students were taught about finite resources using activity-based learning and Lego blocks.**  
Source: Christian College Geelong



**Image 3: A booth set up to present a prototype in the prototype/feedforward stage**  
Source: Christian College Geelong

The safe space created for brainstorming allowed students to build on the ideas of their peers. Students were then asked to filter their ideas using consensus, time and impact constraints, and to use convergent thinking as they moved through all possible scenarios to come up with a final solution. This process of using both divergent and convergent thinking methods in the ideation stage fostered both critical and creative thinking.

Image 4 shows a mind map produced by students using viability and effort as constraints.

As students embraced failure, they were able to see ideas that did and did not work, as well as ideas that would need continual refinement and testing to emerge as a possible prototype. In the prototyping or feedforward stage, students pitched their prototype to their peers and communicated key features of their proposal. The opportunity for feedback allowed students to make multiple iterations of their prototype. Stakeholders were invited to return to the school to listen to the students' pitch. They provided feedback on other limitations such as cost and viability, and students iterated their prototype again based on this feedback.



**Image 4: Mapping of ideas in the Ideation stage**  
Source: Christian College Geelong



**Image 5: Stakeholders were invited to listen to the students' pitch and provide feedback on limitations such as cost and viability.**  
Source: Christian College Geelong



# What are the challenges and characteristics of an effective design thinking curriculum?

One of the barriers observed at Christian College Geelong was implementing the design thinking process for students with disability. As the design thinking project was conducted in an open space to allow for active collaboration and discussion, some students with autism spectrum disorder, for example, felt overwhelmed by the amount of visual stimulation, particularly during the synthesis and ideation stages.

Teachers observed some challenges after the implementation of the project where they struggled to implement design thinking in certain subjects such as History, noting that they felt the subject was unsuited to this methodology as it lacked problem-solving elements.

Teachers also found that students' level of engagement reduced after the implementation of the project, which is a typical occurrence for inquiry-based learning projects. This was one of the main challenges the school observed as they attempted to integrate design thinking back into the school's timetable.

*"The challenge that we found is when you create - what I'd call peak experience like this, after the peak experiences is done unless there are the follow-up opportunities for them to engage in that, they go back to a normal classroom back to a normal timetable. I'd say that's probably the challenge that we face - is that you can't provide those opportunities all the time."*  
(Project leader)

While there were some obvious barriers and challenges in implementing and integrating design thinking, overall the school achieved its intended aims in delivering this project. The impact that design thinking has had at Christian College Geelong can be attributed to its successful implementation.

Teachers' deep understanding of the design thinking framework, enhanced by the on-site coaching and mentoring, allowed them to effectively guide their students through the design thinking stages. Teachers felt that students portrayed a deep understanding of the process and were able to grasp the concept of moving between the non-linear design thinking stages. The biggest impact observed by teachers was a paradigm shift in students' understanding of their own thinking and attitudes towards learning.

The main driving factor for the project's success was having sufficient time. The school not only shut down their Year 7 timetable for two weeks, but staff (including those not in the project team) were also given the time to plan. The following feedback was given when asked to elaborate what makes design thinking successful in schools.

*"It's the school, in terms of how we value time planning. This is the problem most schools have. We were given the two-days training and opportunity to meet every now and again to deliver the sustainability project and with the help from NoTosh. We came up with a product and a plan, we give it to someone and they don't own it, unless they are going to have the time to invest in it and to be trained in it. Not necessarily training with NoTosh but half day with us (project team) well in advance of the curriculum itself so they know where we're headed and the goals."*  
(Project leader)

Having a real-world problem to solve and real stakeholders involved in the project was another main driver of success.

*"To have authentic audience. For the students, they really got excited about knowing that their presentation was going to be to an external person."*  
(Project leader)

# How has DT4L impacted students, teachers and the school in the mid to long-term?

The project leader believed that students involved in this project have benefited immensely. The biggest impact observed among students related to improvements in soft skills such as collaboration, resilience, confidence and time management. As students were divided into teams, they learned to work with their peers and cope with the various challenges that arose such as making sure team members were contributing equally and in time. Throughout the design thinking project, students were given a self-reflection rubric to reflect on their learning and at the end of the project most students reflected on how much they have grown in their problem solving, collaboration and self-management skills.

*“Students saw the ability to be in a different learning environment (not traditional timetable). They valued the personal skills more than measurable skills.”*  
(Project leader)

The ideation stage enabled students to speak their mind and to be more resilient, as they were given a safe space to fail fast and fail quickly. During the interview, students reported that their confidence grew as a result. Students demonstrated higher innovative and creative thinking perhaps also contributed by knowing that they will not be assessed in this project.

*“A hundred ideas bring down your inhibition about thinking of stupid ideas, it really lets you think creatively to gain a new perspective on what you are looking at, things you wouldn't have think about otherwise.”* (Student)


The nature of having real problems to solve with real stakeholders extended the learning environment beyond the classroom to engage students in authentic learning. Learning became more authentic as students were given the opportunity to choose one of the United Nations' Sustainable Development Goals that resonated with them. Students showed a high level of engagement and ownership in their learning process as it was not teacher-directed, or within the traditional classroom or timetable.

*“At the start I was very skeptical, I work very well in the traditional classroom so all these design thinking, visual thinking routines don't make me excited but I forced myself to get into it and studying what I'm passionate about makes me a better learner. I feel more independent and confident when researching or doing anything.”* (Student)

Students interviewed began to see a relationship between learning areas by using divergent, emergent and convergent thinking in the design thinking process. Students used a 'whole brain' approach to engage in critical and creative thinking. For example, the hexagonal thinking tool allowed students to think aloud and visibly connect the ideas with their peers. Students also showed interest in applying what they had learned in other areas:

*“Definitely using design thinking in the coming years, in essays and research projects, just getting these big wide concepts into something narrow and small so you can break it down in these key easy points which you can then explore even more.”* (Student)





*"We've had a great first-up design thinking experience – staff and student reflections have been incredibly positive."*

Students' motivation to embrace this new way of thinking was mainly influenced by teachers in the school. Teachers were empowered to use the design thinking framework to improve their teaching, thanks to the support and commitment from the leadership team. The project leader indicated that teachers began to see the big picture, the potential benefits of design thinking and how the concept could be integrated in their school.

Teachers learned to shift their role from 'teacher' to 'facilitator' as they entrusted students to be experts in their chosen topic, providing resources, guidance and encouragement when needed.

*"(Teachers) learn to facilitate and let students be active and responsible in their learning."* (Project leader)

The project leader also felt that teachers were more collaborative and innovative in their decision-making as a result of this project. For example, the school has been using the design thinking's Gallery Walk strategy among staff to facilitate discussion and ideas to finesse their strategies.

*"Even recently, in a director's meeting, we used hexagonal thinking to consolidate ideas from different faculty."* (Project leader)

At Christian College Geelong, the language and skills obtained during the DT4L project were still in use in the subsequent years after the project's implementation. Students have applied what they learned beyond the project and have transferred their learning across other subjects:

*"Individual activities and languages used was adapted back into the classroom, so when we talk about hexagonal thinking routine, students know what we're talking about."* (Project leader)

*"In talking with the project team, and after the following two iterations in 2018 and 2019, students can actually see that their thinking and their ideas are actually an asset to them, it's a strength to them. It becomes something that balances our high performing and struggling students. That idea of creativity and problem solving is what we're trying to engender in our students, and design thinking has allowed that to happen."* (Project leader)

Although the school faced a number of challenges during and after implementation, they acknowledged that they have benefited significantly from this project. The impact that design thinking has had in teaching and learning was evident throughout the interviews and observations conducted as part of this case study:

*"We've had a great first-up design thinking experience – staff and student reflections have been incredibly positive. Our primary goal was to revamp a poorly executed Year 7 project that was attempted last year. This time around, with a Sustainability theme, linked to the United Nations Sustainable Development Goals and underpinned by a design thinking process, it was a resounding success."* (Project leader)

# Westbourne Grammar School





# Design thinking in the school's context

Westbourne Grammar school is committed to quality education programs and would like to see a consistent approach around developing the skills of students and a framework to support any inclusion or additional programs. The school aimed to use the design thinking approach to provide structure and a foundation for more effective educational programs, leading the school and its learners into the twenty-first century.

The following were some of the project goals for students and teachers:

## Students

1. Develop Fullan's 6 Cs through the implementation of design thinking and STEM.
2. Develop metacognitive skills.
3. Develop and sustain global perspectives as an action learner through design thinking processes and STEM.
4. Work collaboratively across year groups with a wide variety of abilities.

## Teachers

1. Develop a working knowledge of the design thinking process.
2. Use creativity in developing learning programs, following the inquiry process through design thinking.
3. Have confidence in exploring new ideas, areas and content.
4. Have the confidence to enable students to guide their own learning journeys.
5. Re-invigorate staff in learning, increasing engagement and passion.

Westbourne Grammar School has had a strong goal to enable inquiry focus within classroom delivery. The Reggio Emilia inquiry-based program was embedded successfully in its Early Learning Centre and the school sought to build on these inquiry-based skills in the Junior School using the design thinking approach. The school appointed a STEAM learning coach at Verdon Centre (Years 3-6) who had experience in design thinking to assist with the implementation and integration of design thinking in the curriculum. The learning coach worked closely with teachers to understand current teaching practice and learning culture.

Collectively, the school decided to postpone its involvement in the DT4L project when it was launched in 2017, noting that they needed more time to prepare staff. The school liaised with NoTosh in the meantime to unpack the design thinking approach and plan how it can fit into their Junior School. The school signed up for the second iteration of the DT4L project in 2018.

# How was design thinking implemented, and what learnings eventuated in each design thinking stage?

Westbourne Grammar School appointed four teaching representatives, one from each year group in the Professional Learning Community (PLC), to participate in the DT4L project. The decision to select teachers from the PLC ensured teachers across campuses, year levels and subjects could work collaboratively to enable authentic connections and transdisciplinary learning among students. The project team was tasked to engage other staff members in their PLCs throughout the design thinking project. The team participated in the two-day ISV DT4L incubator workshop at ISV's office and were mentored by the learning coach and NoTosh throughout the project.

The project started with a thorough exploration of design thinking and how teachers can model this and introduce the process in the classroom. The team used their PLC meetings to review current units of inquiry from prep to Year 6 in the immersion stage. From a continuation of problem finding and question creation, the team collaboratively created 'how might we' questions to spark discussions for the ideation stage. The team conducted deep analysis on who are they building this idea for and what skillsets they would like their students to acquire.

At the end of the synthesis stage, the team ended up with one question that was broad enough to generate a wide range of solutions for creative freedom, but narrow enough so it is manageable for specific solutions to be created:

*"How might we create better connections between classroom and specialist programs to provide a more integrated approach to student learning?"*

The team unpacked current units of inquiry and the curriculum with its PLC using the hexagonal thinking tool. During the ideation stage, teachers were given permission to 'fail forward', allowing them to explore and move past the paralysis of potential failure.

In the prototyping stage, the school conducted "speed curriculum dating" with specialists across the Verdon Centre (Years 3 and 4) to pilot various prototypes and enable classroom learning that focused on developing metacognition skills. Teachers received feedback during the prototype stage and were able to reflect on these 'failures' and improve on their prototype.

Members in each PLC team also created units of inquiry that used the design thinking process with their students. Among students, the prototyping stage was their favourite aspect of design thinking as teachers relayed that they were more interested in the 'making' component of the process. To emphasise the 'process' rather than 'product' in the design thinking approach, teachers instructed students to make smaller or virtual prototypes to shift their focus from making to thinking. Students presented their prototype in the Exhibitions of Learning in the Verdon Centre, and it was portrayed as a celebration of the skills they had learned and used.



# What are the challenges and characteristics of an effective design thinking curriculum?

One of the biggest barriers observed was instilling confidence in teachers to step outside their comfort zone. Prior to the project, teachers were mostly process driven and were somewhat rigid in how they assessed students. The design thinking process challenged teachers to step out of the assessment framework when needed. Another barrier observed was the difficulty in implementing the design thinking framework across campuses due to the difference between the Junior School's curriculum delivery and that of the Senior School.

Since the project, the school has continued its partnership with NoTosh to seek guidance on consolidating the curriculum, teaching practice and academic rigour through authentic assessments. The school has plans to integrate the design thinking tools within its teacher toolkit and to continue building its design thinking portal to make other staff aware. The school also intends to educate parents around flipped learning (homework) to increase their understanding of shifts in pedagogies.

Overall, the program was highly regarded in the school. The main factor for success was the buy-in and support from the leadership team. Teachers were provided sufficient resources as the school appointed a learning coach and NoTosh to ensure that design thinking was integrated successfully in the curriculum. The time spent unpacking design thinking prior to the commencement of the project was important in building a collective vision for the school. With guidance, the school was able to go back and forth smoothly along the non-linear design thinking process.

*"Without NoTosh's support through coaching and in-house sessions I doubt very much we would have seen such change in our school in such a small time frame. We are continuing on with the journey, maintaining momentum and would like to thank ISV for the opportunity to participate in such a great change maker process."* (Project leader)

Due to the support and encouragement from the leadership team, teachers felt they were given the autonomy and time to plan and implement the project. They were more engaged and motivated to share their learnings, more willing to give and receive feedback and to step out of their comfort zone. This manifested in a whole of school effort to increase the standards of teaching and learning at Westbourne Grammar School.

# How has DT4L impacted students, teachers and the school in the mid to long-term?

Overall, the impact that design thinking has had at Westbourne Grammar School is evident. As a result of the success of the DT4L project, the school has continued using design thinking. Teachers have seen improvements in students' metacognitive skills and were convinced that this was influenced by the design thinking model where the process of thinking is heavily emphasised. Students were reflecting a lot more on the process rather than the final product and they showed a transfer of understanding, not just sharing of knowledge. Students' ability to reflect on their learning and articulate their thoughts was one of the biggest outcomes:

*"They gain that transfer of understanding, I could really see some of the units developing a lot more depth and rigour. I definitely saw a lot more evidence in that deeper level of thinking. The metacognition, that's something that was quite evident."* (Project leader)

The school has also received positive feedback from some parents who have observed a shift in their child's thinking. Students' ability to articulate their experiences at home proved they were able to not only show their parents the end product, but communicate the process of creating it. According to the project leader, many students have developed strong inquiring minds which will guide them to become lifelong learners.

*"Whatever they (students) share with their parents, that is an outcome of a much deeper process".*  
(Project leader)


Teachers felt that students were engaged throughout the design thinking process and to have enjoyed the process of learning. According to the project leader, the DT4L project has instilled a love of learning among students, which is one of the main goals in Westbourne Grammar School.

*"Kids are engaged, you can just see in their Exhibition of Learning, we have parents commenting saying – I don't know what you're doing but you're doing something different."* (Project leader)

The project leader indicated that teachers have integrated the Structure of the Observed Learning Outcome (SOLO) taxonomy into their lessons which focuses on approaches, methodologies and techniques in the valuation of the quality of learning. The project leader also believed that students were able to demonstrate a deep understanding of the design thinking process from the observation and assessment conducted.

The DT4L project outcomes were also evident among staff. An internal survey conducted by the learning coach at the end of the project in 2018 showed that all teachers were 'more confident in unpacking the curriculum'. The design thinking approach has also given teachers a guiding framework to develop their units of inquiry.

*"It's not letting kids go off and do their thing, as a team, you have your key understanding, your transfer goals, your essential questions, and it's up to you as the teacher to ensure that whatever you're doing meets that."*  
(Project leader)



*"There is now a shared vision and focus among staff to implement varying units of inquiry utilising the design thinking process as a pedagogy and as a learning tool."*

One of the biggest achievements was the opportunity to dive deeper to identify the learning skills that mattered in their school. Teachers were able to break down students' learning progress and understand the difference between assessment and reporting in students' learning.

*"We had to work really hard with the staff to develop the curriculum, moving away from content descriptors or assessing content to achievement standards, what we really want the students to have by the end of this."*  
(Project leader)

The project leader also attributed a school-wide benefit from the DT4L project. There is now a shared vision and focus among staff to implement varying units of inquiry utilising the design thinking process as a pedagogy and as a learning tool. Teachers involved in the project have also inspired other teachers in reflecting their current teaching practice and challenged their assumptions about what students in junior years can and cannot achieve. As elaborated by the project leader:

*"It doesn't matter what unit of inquiry is, it's important to spark students' interest. Whatever your unit is, (it needs to be) broad enough for students to come at it from difference angles and being able to transfer it."*

Teachers were given the space and time to reflect on how they teach, assess and report, which has encouraged a willingness to create innovative learning environments. Specifically, teachers had the opportunity to conduct "speed curriculum dating" to pilot various prototypes that focused on developing metacognition skills. The structure of design thinking created a natural flow from research to rollout. As a result of opportunities given by the leaders and a shared vision among staff, teachers felt empowered to make necessary changes in their practice to continually improve the school's standards of excellence.

*"Staff felt they have input into it, not just something that was top down that was being implemented."*  
(Project leader)

The project gave a foundation for the school to identify their students' learning journey and the foundation to integrate future specialist programs across disciplines. Westbourne Grammar School successfully adopted a whole school methodology through design thinking and were able to consistently develop students' skills while delivering prescribed content. As a result, a cultural shift in teaching and learning at Westbourne Grammar School is evident.



# Kilvington Grammar School



Kilvington Grammar School is committed to embedding twenty-first century skills into its curriculum: collaboration, critical and creative thinking, digital literacy and communication skills.

The school's Academic Excellence Pillar has a strong focus on developing the thinking skills necessary for young learners to be independent and resourceful into their future. In addition, Kilvington Grammar School successfully runs annual transdisciplinary projects around STEAM for Years 5-8.

Their objectives for this project feed into the school's strategic direction:

### **Students**

1. Increase their confidence in collaboration, project management, entrepreneurial skills and digital literacy, while allowing them to collaborate and integrate across disciplines, applying knowledge and understanding through design thinking.

### **Teachers**

2. To become agents of change, helping to fully embed the design thinking process.
3. To upskill in working collaboratively across different departments, creating a project that develops design thinking skills to enhance knowledge and understanding.
4. Staff involved in the workshops would be facilitators for this to be expanded on a larger scale at the school, which can then be expanded across the curriculum through a shared understanding.

The overarching aim for the DT4L project was for students to take part in transdisciplinary projects from Prep to Year 12. This was already well on the way for STEAM subjects, with projects in place for Years 7 to 9, and expansion into the junior school was planned for 2020. A successful outcome for this project would be the impetus for extension of transdisciplinary projects across the curriculum, not just in STEAM subjects.

# Design thinking in the school's context

Kilvington Grammar School believes transdisciplinary thinking is essential to allow students to make connections across their learning and see how their thinking can be challenged. They are working from the premise that it encourages students to think deeply and immerse themselves in their learning.

The school's leaders believe that skills for success – sometimes called twenty-first century skills – are the skills students will need throughout their lives. Developing students' perspectives, such as being able to self-reflect and understand how societies are affected by change, while also being able to critique other groups' work in a helpful and thoughtful manner is also important to the school.

As part of the drive to make sure students can address real-world problems by applying knowledge and understanding from a range of subject areas, the school decided to participate in the DT4L program. They were keen to see if they could get the same transdisciplinary thinking they currently have for STEAM subjects, through the Humanities. They also wanted to embed design thinking into their philosophy to underpin their quest to develop thinking skills in students.

The project was called 'Change – what is it good for?' It looked at 'change' across the disciplines of English, History and Geography. The students had spent a semester exploring migration in Geography and the school wanted to see how they would relate it to both their English novel (Runner by Robert Newton about migration) and their History lessons. By introducing transdisciplinary thinking, the connections between the migration patterns from their geography lessons were linked to the migration patterns from history, and the migration theme in their novel Runner. The school concluded in the use of digital technologies to produce a film for the Film Festival to showcase the students' work.

Training for the program took place in 2017 and the project was carried out over a period of two weeks in Term 2 2018, culminating in the Film Festival on 22 June 2018.



# How was design thinking implemented, and what learnings eventuated in each design thinking stage?

The project team was made up of five teachers who represented each of the disciplines involved in the project. These teachers attended the two-day ISV DT4L incubator workshop. The team was aware of the objectives and intended outcomes and were able to champion the project within their faculty areas.

Four mixed ability and gendered classes of Year 8 students worked in groups of three or four. In total, 80 students participated. Sessions were run over a two-week period at the end of Term 2 2018, during scheduled English, History, Geography and Digital Technologies lessons.

The project team ran briefing sessions for the other teachers involved, which led to some confusion in terms of the way design thinking could work in the school. The team therefore decided to take them through the design thinking process and workshop some of the stages and tools they wanted to use with the students. They reported that this was a useful way for the teachers concerned to understand the tools and it gave an insight as to how the students themselves might respond.

In addition, a detailed teacher information book was created which included details for each lesson. This included the design thinking stage targeted, the specific aim of the lesson and activities to carry out to achieve this aim. The teacher information book can be found in Appendix 2: Project Outline for Teachers (Kilvington Grammar School).

The school decided not to teach the students about design thinking per se, as they only had two weeks for the project and felt this would take up too much time. In hindsight they realised they should have allocated more time for this aspect to be taught in more detail, to provide staff implementing the project with a greater understanding of design thinking. However, the project team developed detailed instructions for students with regards to the rationale for the project, what they had to do at each stage and the expected outcome.

Kilvington Grammar School used the 'double diamond' tool to introduce each of the stages to students and what they would be working through at each of these stages. Teachers felt that the students did not quite 'get it' and conceded that they themselves struggled with understanding the process until they had been through it. The team did, however, use the design thinking tools, despite not linking them necessarily to the concept of design thinking.

Students were introduced to the project and the design thinking process during the immersion and synthesis stage. Using post-it notes, they recapped what had been learned about change through their History, Geography and English lessons and stuck them on butcher's paper. They then made connections between the various themes that emerged, resulting in a final theme.

Teachers found the synthesis stage the most difficult part of the project, in terms of getting the students to think. The project leader reported during the interview stage that it was difficult getting students to hold onto

Ideation was reported to be the most enjoyable design thinking stage for teachers and students. As part of their pre-project training the teachers actively participated in this stage, using the tool '100 ideas in 10 minutes', which they found invaluable, not least because it gave them an insight as to what ideas the students might come up with.

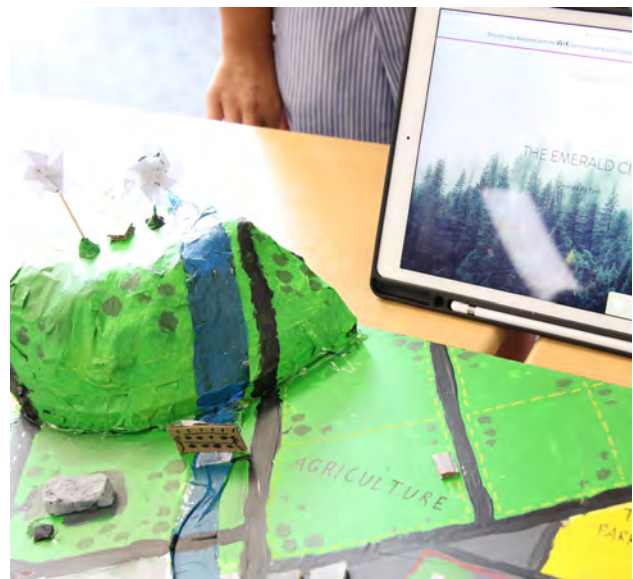
However, the teachers also reported that it was difficult keeping students on track at this stage as they wanted to jump straight to the feedback stage and critique each other's ideas.

'Everyone's a consultant' was a favourite activity for students as they enjoyed interacting and discussing different ideas with each other and speculating which ideas might work and which might not.

Teachers found the prototype stage the hardest to manage because students did not want to go through the cycles, but straight to the end product. Likewise, the students' least favourite or challenging stage was the prototype stage, for the same reasons.

However, students liked the feedforward aspect of this stage, being able to critique each other's work. As such, tools like the '2-minute pitch' and being able to say 'I like this / I don't like that' were popular. Peer assessment and critique is part of Kilvington Grammar School's culture, so this idea was familiar and was able to be done in a respectful way. In addition, they liked being able to get ideas from other people and incorporate these into their own work.

After filtering their ideas, they created a storyboard and filmed their creation. Not surprisingly, the students' favourite part of the whole project was the implementation stage, when they were allowed to work on their film.



**Image 6: Kilvington Grammar School**



**Image 7: Kilvington Grammar School**

# What are the challenges and characteristics of an effective design thinking curriculum?

The experience of running prior transdisciplinary projects at Kilvington Grammar School was a factor in the success of the DT4L project, particularly as finding time to dedicate to it within the timetable was a challenge. However, the project timeline was compressed into the English, History, Geography and Digital Technologies lessons over a two-week period, which meant that students were focused on the task and could maintain momentum. This was achieved by meticulous and detailed planning for each lesson by the Project Team.

While the condensed time period worked for the execution of this project, a lack of time to teach the design thinking skills to teachers and students beforehand was detrimental.

*“We decided we didn’t quite have enough time, because we only had two weeks to do this, that was something that went, and I do think that that possibly needed to be taught in a bit more detail.”* (Project leader)

In retrospect, the team at Kilvington suggested that having more teachers attend the training could also have helped, as could better communication about the schools reasoning behind using design thinking methodology and tools. This may have eliminated the difference in engagement and investment in the design thinking process between the teachers who attended the ISV workshop and those who did not.

Teachers also felt the project did not have the depth they were hoping for and speculated that perhaps they were too ambitious. It linked three different disciplines and, in hindsight, they believed they should have concentrated on one.

Kilvington Grammar School believes that the tools and classroom activities from design thinking can be used to scaffold a student’s thinking when designing or problem solving is needed for a subject. However, they do not believe it is suitable as a model of enquiry for every subject.



# How has DT4L impacted students, teachers and the school in the mid to long-term?

Students at Kilvington Grammar School are already familiar with transdisciplinary projects, and the Year 8 students who took part in this DT4L program had participated in the Year 7 project to design a toy the previous year. However, when comparing the projects pre and post the DT4L program the project leader stated:

*"I think design thinking definitely helped us structure the thinking process a little bit further and got them really just delving deeper and really building on what they have done, and I think in our planning process as well, it's made us force the kids to spend longer on the planning process than on the designing, they're thinking about their designing processes more rather than the actual, let's just rush in and do it".*

The school reported that although the self-reflection rubric that students completed was no longer available – and they were unable to comment as to whether there had been any changes in a student's attitude or work or across disciplines – they did believe their stated objectives for students had been met, albeit with mixed results. Some students were able to make strong connections between the different disciplinary areas and were able to follow the processes they were given. This helped structure their thinking in a way they could develop what they were talking about. Others did not quite reach the same heights, although, as the project leader said, that's the case with any project. The teachers particularly liked having an objective for each lesson, so the students were held accountable.

The project leader stated that the design thinking planning process forced students to spend longer on the planning rather than the designing stage, resulting in students thinking more about their design process, rather than jumping straight in to create it. This produced better products at the prototyping stage. However, this is an area they still want to develop, to ensure adequate testing is completed before students embark on creating the final iteration.

The school believed the stated objectives for teachers had been partially met. They reported that the teachers involved in the training used the design thinking tools and techniques quite often, however, the teachers who weren't directly involved in the training, were less invested in the process and therefore were less inclined to use the tools. The school acknowledged this was probably due to the tight timeline and insufficient time being given to explain and teach other staff members about design thinking.

The group of teachers who did attend the ISV workshops have used the skills they learned to enhance their set-up and running of similar projects:

*"We have been able to take on the tools we learnt for the design thinking – I've already put together three or four different projects using those tools (for year levels) seven, eight and nine. We've even used them for the ten and eleven systems engineering projects".*  
(Project leader)

There was evidence in continuity of the design thinking principles and outcomes in this school beyond the DT4L project. The project leader found that the Year 8 students from 2018 who went on to participate in the Year 9 project in 2019, were much more mature and were more prepared to throw ideas in the ring without holding onto them too strongly.

In addition, the tool '100 ideas in 10 minutes' was used in the Year 8 sustainability project in 2019 and likewise various strategies have been used to get Year 7 to tailor their thinking for the 2019 STEAM project. The program has also given the teachers confidence and language to use when dealing with other institutions who use design thinking.

*"Our Year 9, 2020 cohort, will be working on a social enterprise project with Monash University – who are well versed in design thinking strategy – and so it's been really good for me to be able to feed into it on an equal footing".*  
(Project leader)

Overall, the introduction of the DT4L project has proven to be beneficial to teachers and students at Kilvington Grammar School. The project provided a platform for reflection on what could or could not work in the school's current environment. Staff have continued to use the skills they learned to enhance their set-up and running of similar projects.



**Image 8: Kilvington Grammar School**



**Image 9: Kilvington Grammar School**

# Conclusion





*“Design thinking has the potential to provide an innovative learning environment that supports a culture of collaboration and growth.”*

The design thinking project was unique in each school, with varying intentions, experiences and impact. Overall, schools have found that the project was beneficial to teaching and learning and intended to continue using design thinking to some extent. The process of going through the design thinking stages has allowed teachers to be facilitators of learning as they guide and encourage students to be active participants in their learning while monitoring student’s learning progress and outcomes.

Students were more empowered as they were given the freedom to experiment and express their ideas and opinions in a safe, supportive environment. The opportunity to utilise various thinking skills and reflect on their learning encouraged autonomy and self-regulation in learning. The immersive learning experience with real-world application also helps bridge the gap between gaining academic knowledge and developing practical skills beyond the classroom.

The experience of the project in all case study schools was generally positive. The main challenges were difficulty in integrating design thinking across disciplines and campuses, lack of understanding of the design thinking concept, insufficient time and resources, and a lack of investment among other staff members.

The research demonstrates that how design thinking was introduced and implemented influences the perceived challenges and impact. It is critical that teachers are given sufficient time and resources to plan how design thinking will be implemented in their school, and a guiding framework to develop their unit of inquiry and to facilitate the design thinking process. The planning stage is important to ensure that the project aligns with the school’s context, and students and teachers’ knowledge, readiness and mindsets before jumping into the design thinking processes. When done well, design thinking has the potential to provide an innovative learning environment that supports a culture of collaboration and growth.

Please refer to the link below to view the main DT4L research report.



Read the research evaluation report at [is.vic.edu.au/design-thinking](https://is.vic.edu.au/design-thinking)

# Appendix



# Appendix 1: Limitations of the case study research

One of the limitations of the case study is the sample itself. While the schools were randomly selected, only three schools volunteered to be involved in the case study research. Although the schools vary in size, they have similar social economic backgrounds and are co-educational schools.

Secondly, the DT4L project in these schools were seen as generally successful. Two of the three schools received further support from a design thinking coach throughout the project.

The case study research may bring more insight if it included cases of failure, and schools from various demographic profiles to explore design thinking in different settings. Nevertheless, comprehensive evaluation and solid inferences were made from the data collected during and after the implementation of the project in these schools.



## Appendix 2: Project outline for teachers (Kilvington Grammar School)

Lesson aims	Activities
Design thinking stage: Immersion and synthesis	
Introduction to project and design thinking Process Make connections between themes Choose the final theme	<ol style="list-style-type: none"> <li>1. Introduction to project (slides 2-9, 15 mins)</li> <li>2. Brainstorm what you have learned this semester (2 mins)</li> <li>3. On post-its, write as many examples of change and that have been discussed in History, Geography, English (different colour post-it notes for each subject). Place on different pieces of butcher paper – 1 per subject (15 mins)</li> <li>4. Create clusters – at least 1 post-it of each colour in each cluster, with a theme as the connection within each culture. (10 mins)</li> <li>5. In or Out? 2 mins – choose the theme (5 min)</li> </ol>
Design thinking stage: Ideation	
Brainstorm initial ideas for film Filter ideas down to 3 prototypes	<ol style="list-style-type: none"> <li>1. Write question – how might we evaluate change in [THEME] through film? on butcher paper for each of the different themes identified. (5 mins)</li> <li>2. Everyone’s a consultant – students’ write ideas and thoughts on post-its, and stick on to each-others’ question – how could this work? (10 mins)</li> <li>3. Ideas for film – 100 ideas in 10 minutes</li> <li>4. In teams – highlight interesting ideas. Feedback on three that they found interesting. (10 mins)</li> <li>5. Choose 3 ideas – what is your safe-bet, darling, moonshot? (15 mins)</li> <li>6. Feedback to another group – write down on butcher paper</li> </ol>
Design thinking stage: Prototype and feedforward	
Create initial storyboard for 3 ideas Choose one idea for “pitch ImPerfect”	<ol style="list-style-type: none"> <li>1. On Butcher paper, create loose storyboard for 3 ideas. (10 mins)</li> <li>2. Everyone’s a consultant – students move around the room and write 2 stars and a wish for each idea. (10 mins)</li> <li>3. For each of the three ideas, give a mark out of 10 – interesting? Connects to the content? Feasible? (10 mins)</li> <li>4. Choose 1 idea for “Pitch Unperfect”. Explain to class in 1 minutes. Feedback – I like and Even better if... (20 mins)</li> </ol>
Create detailed storyboard and production plan	Create a Production Plan which includes <ol style="list-style-type: none"> <li>1. Detailed Storyboard for your film</li> <li>2. Create a Shot list including               <ul style="list-style-type: none"> <li>• Props/Costumes</li> <li>• Scripts</li> <li>• Equipment</li> </ul> </li> </ol>
Filming	Filming
Post production	Marketing director – makes trailer and film posters Editor – Edits film Online content coordinator – press release and website
Reflection	Complete critique of another group’s website and film Complete self-reflection rubric



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