Winston Churchill Memorial Trust Fellowship 2016

Creating the conditions for deeper and significant learning in schools in California

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Acknowledgements

The Winston Churchill Memorial Trust & The Mercers’ Company for the wonderful opportunity to visit and learn in California. Principal, Geraldine Davies and the Governors of The UCL Academy for allowing me significant time to visit California during term time. To the amazing educators and students who have given up their time to answer my questions, including, John Bosselman, English Teacher High Tech High, Chula Vista, Rob Riordan, Co-Founder of High Tech High, Alec Patton, Humanities Teacher High Tech High, Chula Vista, Chris Wakefield, Physics/Math teacher High Tech High Media Arts, Vince Wolfe, Principal, & colleagues at Big Picture, Sacramento, Sara Leonard, Principal & colleagues at Big Picture San Diego, Dr Sebastian Cognetta Director, Dr Kate Bean Executive Director & Colleagues Aveson Charter Schools, Steve Wallis, Principal, Da Vinci Science, Julie Abraham, D Tech High School, Shelli Kurth & Dr Nicole Assisi & colleagues, Thrive Schools, San Diego.
Glossary

**Project Based Learning (PBL):** PBL is defined by The Buck Institute of Education as ‘... a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging and complex question, problem, or challenge’.

**Grade K-12:** Kindergarten is the equivalent to year 1 in the UK. 12th grade, the UK equivalent is year 13.

**Service learning:** Defined by Fayetteville State University as '...a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities'.

**Mastery Based Grading (MBG):** An approach that assesses the extent to which students master core academic content in a project, topic or unit of work.

**Internship:** A temporary experience of on the job experience and training.

**Presentation of Learning (POL):** An authentic means of assessing student progress as students present their learning to parents. These take many forms such as passage presentations and exhibitions.

**Continuing Professional Development (CPD):** The process of gaining new knowledge and skills through formal and informal training.

1 https://www.bie.org/about/what_pbl
About the author

The focus of my project has emerged from 10 years of experience as a teacher in the North East of England and in London. Having taught Geography and worked on an innovative cross humanities curriculum, I became engaged in innovative curriculum design. I now teach Geography at a school in London and lead on the whole school approach to interdisciplinary learning and connecting subject disciplines. The Winston Churchill Memorial Trust Fellowship has allowed me to deeply reflect on my own approaches to teaching and leadership. It has given me an invaluable insight into modern curriculum design and whole school approaches. I hope to use this experience to further advocate interdisciplinary and Project Based curriculum design at my current place of work and future workplaces.

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Executive summary

This study aims to draw together various conditions that enable deeper learning to happen. The study will report on findings from several schools in California, in particular, approaches to curriculum design, assessment practices and leadership structures. The findings from the visits to schools in California where conditions of deeper and meaningful learning can be summarised;

- **Learning is project based**: These opportunities are built on strong teacher and community collaboration. Students work towards authentic products of learning that have a wider impact in their localities.
- **Intergenerational learning is commonplace**: Students work with adults and the wider community to solve authentic problems facing their localities. These are strong reciprocal relationships that are developed over time.
- **Students have deep and meaningful internships** that enable them to see the big picture of education, college and careers. These are enabled because they are a crucial part of the curriculum and a significant amount of time is given to make internships effective.
- **Learning is highly personalised** to the individual using data effectively when appropriate. The curriculum and assessment models are carefully designed and disrupt traditions such as timetabling and same age class groups. Timetables are flexible and students work with students of different ages forming a stage not age approach.
- **Students are able to master key knowledge, understanding and skills** of academic subjects. This is built on rigorous approaches to assessment within project based and innovative curriculum designs. Newly acquired knowledge and skills are applied in different scenarios which leads to longer term retention.
- **Students are authentically assessed** beyond traditional means. Approaches such as testing are used but so are methods such as exhibitions.
and POL’s so that students are accountable for their own progress. Relationships and means of assessment beyond the teacher and the classroom are implemented. High porosity between the school and outside educators in businesses and the community leads to effective means to assess students in powerful ways.

- **Leadership empowers and trusts educators** to design deeper learning opportunities through collaborative approaches to CPD and curriculum design. Schools have distributed and collaborative leadership structures that are usually non-hierarchical. The collective human and social capital is embraced which leads to strong outcomes for students.

- **Learning is interdisciplinary** and allows students to make links between their learning. Project based approaches to curriculum design leads to deeper cross curricular units of work. Flexible timetables and open learning spaces allow for creative curriculum design that thinks beyond the silos of individual disciplines.
Section 1: Introduction

“What if, instead of seeing the classroom as a theatre, we could view it as an engine?”
Mick Waters

The film ‘Most Likely to Succeed’ neatly summarises the need for innovation in schools. The film includes interviews with educational thinkers such as Sir Ken Robinson and Salman Khan, however, the stars of the film are undoubtedly staff and students at High Tech High, San Diego. This was a school that was intensively visited as part of this report. The film is based on the premise that the design of schools is based on an industrial/factory model to fit the needs of the economy of the 20th century. This view is also highlighted in Sir Ken Robinson’s famous TED talk and converted into an RSA Animate: Changing Education Paradigms. The 21st century demands students who can think critically, problem solve and think deeply about a problem through processes of collaboration and enquiry. This is partly because of a change from the old paradigm of employment where for example, people may have stayed in the same 9-5 job to the new knowledge economy of today with more flexible and new types of employment.

There are calls for what Guy Claxton and Bill Lucas would call an ‘expansive education’ in their book ‘Educating Ruby’ that would prepare students to be resilient to the complex world they grow up in. Furthermore, in her book ‘Learning Futures, education technology and social change’, Keri Facer argues for an ‘educated optimism’ in a world facing political, environmental, socio-economic and technological challenges. A good education is more than simply about moving students into further education but is about security and wellbeing for children when

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3 http://www.mltsfilm.org/
4 https://www.ted.com/talks/ken_robinson_says_schools_kill_creativity?language=en
5 Claxton, Guy, and Bill Lucas. Educating Ruby: What Our Children Really Need to Learn. Print
they become adults. This mantra that education needs to evolve to fit the needs of learners for the 21st century is articulated well in a foreword by Andreas Schleicher, Director of Education and Skills at the OECD in a report titled ‘Schooling Redesigned: Towards Innovative Learning Systems’⁷. The foreword argues that the knowledge and skills that are easy to teach are those that are easily automated and digitised. Therefore we need to foster motivated and engaged students capable of conquering the unforeseen challenges, capable of “extrapolating what we know and applying that knowledge in novel situations”. It continues to suggest that building value and invention comes from connecting the dots between different disciplines. We need “versatilists who are able to apply depth of skill to progressively widening scope of situations and experiences, gaining new competencies, building relationships and assuming new roles”.

From an interview with Rob Riordan⁸ for the purposes of this report (see section 5), Riordan highlights the need to transform knowledge into something new. The schools visited in California for this project are beginning to revolutionise the ways that teaching and learning takes place. There is an urgent need for the design of new innovative schools in the UK, for example through collaborative partnerships and the opening of Free Schools with an innovative agenda. There is also a need for existing schools to increase their capacity to innovate in ways that lead to significant learning experiences for all children. One of the schools visited, Thrive, highlights that only 1 in 4 kindergartners in California will make it to college meaning that 75% of Californian students will not have equitable job access. They will earn 60% less than their peers with a bachelor's degree. They highlight an absence of critical thinking and creativity in the education system.

In the context of this report, ‘deeper’ and ‘significant’ learning are defined as that learning beyond the moribund model of a factory farmed one size fits all education. It is that which students can transfer and transform into something new. The Hewlett Foundation⁹ define deeper learning as one where students;

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⁸ https://hackthecurriculum.wordpress.com/2016/06/02/30-minute-interview-with-rob-riordan/
⁹ http://www.hewlett.org/programs/education/deeper-learning/what-deeper-learning
• Master the core academic content, understanding the key components of academic content.
• Work well in teams.
• Are able to think critically, analytically and creatively.
• Can communicate effectively in both written and oral presentations and can give feedback effectively.
• Can direct their own learning set their own goals and track their own progress.
• Have an ‘academic mindset’ where they believe in themselves and trust their own abilities and that hard work will pay off.

It is not just the unknown future that is relevant to deeper learning. Pellegrino et al\textsuperscript{10} write about the transferable competencies required for the working world. This report also defines deeper learning as the ability to transfer what one has learned to solve problems. Students gain a blend of knowledge and skills known as ‘21st century competencies’ meaning students can relate knowledge and skills rather than them being disparate or superficial. 21st century competencies are a product of deeper learning practices that will be written about in this report. Competencies are described as cognitive, interpersonal and intrapersonal (Pellegino et al).

Cognitive competencies may include critical thinking, information literacy, reasoning and innovation. Intrapersonal competencies could include flexibility, appreciation for diversity, and metacognition. Interpersonal competencies will include collaboration, teamwork, responsibility and conflict resolution for example. In this report for The Winston Churchill Memorial Trust, several schools were visited in California to investigate innovative approaches that can ultimately lead to deeper and more significant learning.

1.1 Aims and Objectives

This project aimed to study schools in California that demonstrate and showcase aspects of deeper and significant learning as their core philosophy, vision and ethos. All of the researched school curriculums have a focus on Project Based Learning as part of their curriculum for example. However, each school is different in their design of curriculum and assessment. This project aims to study deeper learning approaches to curriculum design, assessment practices and leadership conditions. To that end the project aims to address several enquiry questions;

Curriculum design: *How does curriculum design lead to deeper learning? How does curriculum design lead to interdisciplinary and cross discipline learning?*

Assessment practices: *How is deeper learning assessed? How is mastery achieved in a project based approach to teaching and learning?*

Leadership: *How are schools organised to lead to innovative and deeper learning practices?*
1.2 Methodology

Firstly, the writer's own contacts from working with The Innovation Unit’s REAL Projects\textsuperscript{11} team to identify schools that are known to practice elements of deeper learning were utilised. The author has worked with colleagues at High Tech High, San Diego through the REAL Projects initiative that gave reliable contacts in California. A week and a half visit was organised through established contacts at High Tech High, Chula Vista and High Tech High Media Arts. It was decided with the time allocated to stay in California where there are many interesting institutions. The Getting Smart organisation website has a blog that recommends 100 schools worth visiting\textsuperscript{12}. From there, individuals were contacted via email of all of the institutions in California. Once visits were arranged, an itinerary was drawn up thinking about where in California the schools are located. A range of schools were visited. For example schools that were new start ups to schools that are already established. All of the established schools were high performing, for example High Tech High and Big Picture networks have almost all students going to college as a measure of their success. Some schools are in contexts of high poverty and intakes of high social deprivation. Others have a more selective intake. Some schools are bound by state standards such as Bulldog Tech whereas other charter schools have more freedom over curriculum design. This is interesting in the UK context where some aspects of deeper learning researched in this project may be more or less appropriate to different schools and social contexts.

Seven schools were visited overall. In order to carry out the enquiry and to find answers to the research questions several methods were used. This was mainly informal with classroom observations and discussions with teachers and students. Some formal interviews were planned with inquiry questions in mind for school administrators and leaders. Documents were also collected and analysed such as school timetables, assessment rubrics and curriculum plans. A set of common questions were asked to various educators, administrators and students, examples

\textsuperscript{11} \url{http://www.real-projects.org/}
\textsuperscript{12} \url{http://gettingsmart.com/2014/11/100-schools-worth-visiting/}
are listed below;

1. Describe your role as a teacher
2. Why do you work at this particular school?
3. Describe the learning environment you teach within in just 5 words
4. Describe the culture of your school in just 5 words
5. What is the school motto?
6. How have you been inducted into the culture of your school?
7. How does the organisation and structure of your school enable the existence of its distinctive culture?
8. How does the organisation and structure of your school enable students to learn effectively?
9. How does the organisation and structure of your school enable you as an educator to learn effectively?
10. How does the organisation and structure of your school affect your agency as an educator?
11. How is the school leadership structure organised within your school?
12. How would you describe the relationship between the school leaders and the teaching staff?
13. As an educator what are you responsible for?
14. As an educator who do you feel you are accountable to?
15. What would you say to a traditionalist who disagrees with your approach?
16. What accountability measures does your school have?
17. What evidence is there to support your distinctive approaches?
18. If you could keep only one aspect of your school what would it be? i.e. what is the most important feature of the school?

Limitations to the study included time. As a full time teacher in the UK it is understandably difficult for schools to allow teachers significant amount of time off. The author was able to visit California at the end of the USA academic year at a time most convenient for his own school. Although a good amount of institutions were
visited, some were not able to accommodate a visit because their term had already ended. Furthermore, because of the popularity and huge amount of requests some schools receive for visits, it was hard to arrange visits to some other interesting schools.
1.3 Schools Visited in California

High Tech High Media Arts, San Diego [http://www.hightechhigh.org/]: A school of approximately 400 students in grades 9-12. A focus on project based learning and a college going culture and strong focus on science and liberal arts. Uses a computerized lottery system to determine admissions. The schools are highly oversubscribed, admissions intend to reflect the demographics of the region in which the school is located.


Da Vinci Science, Hawthorne [http://davincischools.org/]: Da Vinci Schools operate 3 independent public charter high schools. Da Vinci Science alongside Da Vinci Communications and Da Vinci Design. They serve 1,475 students across 80 zip codes. Da Vinci Science grades 9-12 specialises in Engineering. Student admission also by lottery.

Thrive, San Diego [http://www.thriveps.org/]: Thrive is a nonprofit operating public charter schools in San Diego. The eventual capacity will be 1000 from K-12. The school has a unique personalised learning model. Student admissions by randomized lottery.

Aveson Charter Schools, Altadena [http://www.aveson.org/]: Aveson Charter schools consist of Aveson Global Leadership Academy, grades 6-12 and Aveson School of Leaders K-5. They have a focus on personalised mastery learning.

Design Tech High, San Mateo [http://www.designtechhighschool.org/]: Also known as D Tech, specialises in technology, design thinking, and skills helping students to forge their own identities. They have a focus on mastery and also creative problem solving. Admissions by lottery.

Big Picture, San Diego & Sacramento [http://www.bigpicture.org/]: Big Picture schools are highly personalised where students are in a small community of 15
students called an advisory. Students also have an internship and mentor. San Diego Met serves 200 students in grades 9-12 and is part of the San Diego Unified School District. The Met Sacramento is also a small school of 300 students.

**Bulldog Tech, San Jose** [http://www.bulldogtech.org/]: Part of the NewTech network of schools, located in Silicon Valley, Bulldog Tech is a middle school of 300 7th and 8th graders. It is part of the Evergreen School District.

Some other influential schools in California, unable to visit;

- Summit Public Schools, [http://www.summitps.org](http://www.summitps.org)
- Alt School, San Francisco [https://www.altschool.com/](https://www.altschool.com/)
Findings

Section 2: Curriculum design

2.1 Community curriculum making

In a blog for the British Educational Research Association (BERA), Professor David Leat writes about ‘Turning Schools Inside Out’. Community curriculum making (CCM) has advantages over an ‘introverted’ education system determining curriculum and assessment in the confines of an education industry. These advantages include firstly engagement, where there is evidence of students finding CCM work compelling. Secondly, CCM can build complex identities, “a CCM approach can provide very valuable raw material in terms of role models and experience. At a more basic level students would get to meet a far wider range of people if their school is outward facing. So meeting a dietician, a curator, a care worker, a sound engineer, an allotment holder, a fashion buyer, a joiner or a university researcher can all add to an early store social capital, as well as create insights into working and volunteering worlds and career opportunities.” CCM also builds meaning to students work leading to wide project outcomes. “...a compelling argument can be made that such approaches could have wider social leverage through encouraging more informed labour market choices, widening participation and greater social justice.”

All of the schools visited had aspects of community learning. For example at Da Vinci Science, students complete 10 hours of service learning for a total of 80 hours by the time they graduate. These include volunteering working with non-profit organisations and projects that address a need in the community. At High Tech High Chula Vista, the curriculum is community oriented. “Fusing project based learning with real cooperative community learning experiences, High Tech High Chula Vista

13
https://www.bera.ac.uk/blog/turning-schools-inside-out-developing-curriculum-with-community-partners
students have the opportunity to affect change in both their communities and families, and within themselves.” (HTHCV website).

John Bosselman14 is a 12th Grade Humanities teacher and with his teaching partner Megan Willis has designed and co-constructed The ReVision Project15 with their 12th Grade Class groups. This project has deeper learning at its core with students applying their learning to the real world.

The students and teachers are transforming their learning by creating a design consultancy. Using the principles of ‘Human Centred Design’ to structure the learning process, this project allows deeper learning through enquiry, working closely with different adults and experts and delivering on outcomes with real value to local communities. 12th Grade is the equivalent to year 13 in the UK. In the UK it is when most students sit their A level examinations, for those wanting higher education qualifications, these grades indicate which university they will attend. College admission in the US is different where admission will be based on a Scholastic Assessment Test (SAT) and is not aligned to school curriculum. Some colleges will used grades from high school classes and in some schools offer college preparatory classes.

14 https://sites.google.com/a/hightechhigh.org/jbosselmandp/projects
15 http://www.revisionproject.com/
The UK is bound more by high stakes and externally assessed testing at A level and therefore could be more appropriate to teach to the test. Through the ReVision project, students are practicing deeper learning and 21st century competencies that perhaps are not as evident in a limiting A level setting in the UK. The ReVision project has students working on a number of design projects that go beyond simulating the world they are about to enter. Students are working on a number of design projects such as designing an innovation lab for artists, designing the expansion of the school campus and redesigning a local food pantry to support low income families. Students are immersed in problems that their local community is facing and are making a difference to people who live there. One project within the ReVision project is the Bioswale. The students’ enquiry question is ‘how might we create a bioswale that functions both as a water filtration system and as an educational inspiring place?’ This is an interdisciplinary problem that reflects the nature of problem solving in the real world. Silos of knowledge and skills from A level classes may be useful to pass an exam, however, they need to be transformed into solving a real problem for that knowledge to have any lasting value. In order to be able to design a bioswale, students in the ReVision project need rich and varied knowledge across the group. They also need to apply 21st century competencies in order to be successful. They will need to develop investigative and fieldwork skills in order to identify the problem and evaluate their solutions. They will need to conduct academic research on pollution around ways of collecting data and also on the core knowledge such as ecosystems and hydrology. These skills and knowledge might be taught in isolation in an A level Biology or Geography class. Further deeper learning occurs as students ideate, experiment and design prototypes together based on their foundation of academic research.
2.2 Human Centered Design

Much of the curriculum at High Tech High and Design Tech High have a ‘design thinking’ approach to curriculum design. If we want our students to think creatively and to be solving problems, the design thinking approach allows students to think like a designer. “It relies on our ability to be intuitive, to recognize patterns, to construct ideas that are emotionally meaningful as well as functional, and to express ourselves through means beyond words or symbols”. IDEO’s Field Guide to Human Centred Design is used by educators as a framework for innovative project based curriculum design. Human Centred Design allows students to adopt mindsets not usually associated with high school. Design thinkers experiment, tinker and ideate. The seven mindsets that set design thinkers apart are Empathy, Optimism, Iteration, Creative Confidence, Making, Embracing Ambiguity, and Learning from Failure. The students interviewed and observed at schools in California were certainly adopting these mindsets. It leads to high engagement, students working collaboratively and transforming new knowledge into something of value and pride.

The Field Guide to Human Centred Design gives a series of tools that allow designers to follow the design process. It allows students to carry out ethnographic studies using a range of tools leading to prototypes and products of learning based on empathetic research. The three phases of design thinking were also visible in the work produced by students for example at High Tech High, Chula Vista. The ReVision project used the toolkit and the final products of learning were on display alongside the processes involved. Students are having powerful deeper learning experiences by learning through human-centred design projects. Regina Kruglyak’s and Britt Shirk’s 9th grade Tiny Homes Project captures the essence of a human centred design project. 54 ninth grade students work to design and build affordable homes for artists in the local community. The students designed and built 3 tiny homes in collaboration with a local non profit organisation. The design process

16 https://www.ideo.com/about/#KCi4p0X4i1YXQAO9.99
17 https://www.ideo.com/work/human-centered-design-toolkit/
18 http://www.hightechhigh.org/hthcv/project/tiny-homes/
follows a process of inspiration, ideation and implementation. Students are developing a wide range of dispositions, skills and knowledge over the course of the project. For example, students are interviewing and empathising with the needs of the artist community. They fundraise through kickstarter (raising $18000) and consequently understand the costs and finances involved in the project. They are also learning the practical skills of building the tiny homes.

In a typical school in the UK with a siloed and disconnected curriculum, there can be little space for students to develop the mindsets practiced by students observed in California. There may be separate elements of enterprise or some bolt on community volunteering. Rarely is the curriculum designed in a true interdisciplinary way over a long-term unit that leads to truly authentic outcomes. The design thinking process through the various projects students were working on allows them to demonstrate and practice a range of skills such as communication and teamwork. These skills need to be practiced, in my opinion, beyond the artificial environment of a classroom.
2.3 Open learning spaces

For deeper and interdisciplinary learning to take place, the built space that students work in can enhance these approaches. Some of the schools visited in California have innovative learning spaces that allow a different dimension to curriculum design. At Design Tech High, the temporary space had a mixture of classrooms but also a large multi-disciplinary open space called the ‘hanger’ and a separate large makerspace. Within the hanger the space was being used as a maths classroom, dance space and robotics space when visited for this report. There are opportunities for students and educators to work across disciplines.

At High Tech High, classrooms are designed into pairs or pods and there are wide corridors and smaller communal spaces to allow for collaborative work across two or more disciplines. Student work is displayed and curated carefully. In Chula Vista, much of the
displayed project work shows the process that students have followed through the duration of a project. At Bulldog Tech, classroom spaces were large so that class sizes of 60 can be team taught by two or more teachers. This therefore allows cross curricular expertise to shape the curriculum.

2.4 Internships and adult world connections

The San Diego Met and Sacramento Met Big Picture Learning Schools, have Learning Through Internships (LTI) programmes. Internships are a core component of the curriculum at Big Picture schools. In both Big Picture schools visited, students spend two days per week on internship programmes. One example comes from an interview with a student called Judge. Judge had been a piano teacher, worked in PR for public theatre and worked in guitar design in previous internships. During the interview with him, he is designing a website for a collaborative project where he is working with college students on an aquaponics project. He is excited in anticipation of working at San Diego State University in the summer on an internship at a genetics institute. Another example was from observing a presentation of learning (POL) at Sacramento Met of an 11th grade student called Gabe. A POL allows students to reflect on their learning across several areas of school and life. Gabe’s internship was working at a dog daycare. He reflected on his success and enjoyed the internship and became employed there part time. He has been given increased amounts of responsibility throughout the internship, this is an actual job rather than ‘work experience’ that often happens in the UK. Gabes’ advisor at Big Picture, Phillip, asks questions about wider life skills i.e. is he saving his wages and other important details of finance. He also asks Gabe to clarify what he means about working independently and collaboratively and if the two are contradictions.

LTI’s at San Diego Met includes student internships at over 600 businesses over the decade the school has operated. This database has grown as students have found their own passions and interesting internships. The internship programme ensures students are completing real world authentic tasks. These are rigorous and
experiential as opposed to some ‘work experience’ programmes at schools in the UK, that are too short. Students spend 2 days per week on LTI’s or between 8 and 16 hours per week. Students have an internship mentor to support students through their internship. Vince Wolfe, principal of The Met, Sacramento passionately talks about students taking responsibility and developing skills that can’t be developed in the classroom. The benefits of LTI’s mean they develop professional attitudes through relationships with adult mentors and other colleagues. They learn job specific skills but also skills of organisation, time management and taking initiative. Most importantly, they develop a sense of importance for their education and consequently develop long-term goals for college and career preparation. LTI’s are a structured programme and are usually led by a school internship coordinator. Internships are expected to be meaningful and are structured around the following guidelines at The San Diego Met school.

- An essential question: e.g. what role does demographics play in radio advertising?
- Relationships: Must work with two or more adults
- Resources: Must use two sources e.g an interview
- LTI’s must meet two of the 5 Met learning goals\(^\text{19}\).
- Evidence must be compiled e.g. photographs, blogs, reports etc.
- Presentation: An 8 to 10 minute presentation created.
- Written project reflection of 500 words addressing set reflection questions.

Big Picture schools also encourage 40 hours of community service per semester. At Da Vinci Science, the bridge between the classroom and workplace is supplemented by internships and work experience programmes. Work experience is an elective subject of approximately 12 hours per semester, working afternoons 2 days a week. They have 8 week internship programmes some over the summer holiday period. The school also has a structured approach to volunteerism that can build students social and academic capabilities. They also have a programme of classroom based adult world connections through outside speakers, mock interviews and field trips for

\(^{19}\) http://www.bobpearlman.org/BestPractices/BLC%202006/learning%20goals.pdf
example. Da Vinci ultimately has a rich curriculum with opportunities for deeper learning within the context of high academic expectations.

### 2.5 Project Based Learning

All of the institutions visited in California practiced project based approaches to curriculum design. Tom Stephens Winston Churchill Memorial Trust report\(^{20}\) researches in depth PBL in the North East USA and in Sweden. This Churchill Fellowship comprehensively studies Project Based approaches to curriculum design. Furthermore, *Work that matters: The teacher’s guide to project based learning*\(^{21}\) by Alec Patton and Jeff Robin, provides a valuable resource and summary of how PBL works. PBL is an approach to curriculum design that empowers, motivates and engages students with their learning. PBL is not a pedagogy, the best forms of PBL observed in California use a range of pedagogies and assessment processes within a PBL approach. For example, at High Tech High all learning is through PBL and at Da Vinci Schools, PBL is running alongside a mastery approaches to assessment. Within a project teachers will assess their students rigorously such as through tests, essays, presentations, mastery questions and other assignments. A range of pedagogical


processes are used within a PBL approach, predominantly enquiry but also socratic seminars around a rigorous text. It is also not unusual for teachers to deliver explanations of difficult academic content and concepts that this report refers to as masterclasses. Teachers will scaffold and structure student enquiry and help them to develop as critical thinkers. At Da Vinci Science, projects are designed by teachers but built on ‘essential knowledge and skills’ that students must master to be proficient in that subject. At High Tech High, projects take interdisciplinary and community dimensions. Da Vinci defines PBL as having the following nine project expectations:

- Driving question
- Feedback & revision
- Scaffolding
- Differentiation
- Rubrics
- 21st century skills
- Multiple opportunities for students to demonstrate mastery of essential skills
- Authentic products
- Presentations of learning

*Work that matters* describes three essential keys to project based learning.

Key 1: Exhibition ‘When students know that the work they are creating in a project will be displayed publicly, this changes the nature of the project from the moment they start working – because they know they will need to literally ‘stand by’ their work, under scrutiny and questioning from family, friends, and total strangers’. Work that matters.

Key 2: Multiple Drafts: “In most schools, students turn in first drafts – work that doesn’t represent their best effort and that is typically discarded after it has been graded and returned. In life, when the quality of one’s work really matters, one almost never submits a first draft. An ethic of excellence requires revision.” Ron
Berger, Chief Programme Officer at Expeditionary Learning (from *Work that matters*).

Key 3: Crique: “*Getting into the habit of creating multiple drafts of work has a huge impact on how students regard their assignments, their learning, and themselves. It is especially effective when students are critiquing each other’s drafts, rather than just handing in drafts to a teacher*” (from *Work that matters*)

An example of a project observed in California was during an extended visit to the classroom of Chris Wakefield at High Tech High Media Arts. Chris is a 9th grade Math/Physics teacher and works on projects within those subjects and also alongside his Humanities counterpart. The project and later exhibition demonstrated interdisciplinary approaches and captures the essence of PBL. Chris’s passion for his subject and bringing in other interests such as Art was clear to see. The students were preparing for their exhibition night later in the week and observed was the wonderful work they were doing. A learning session observed was in the context of a project around the topic of gravity and motion. Chris made the lesson come alive and got the students fired up for exhibition night, turning the lights off and using a black light to show the illuminated tennis balls hanging in the space. They were going to have DJ music and essentially were transforming their learning about trigonometry into something new. Students were applying their learning in Math and equations linked to motion and trajectories to create their product of learning. Students were using research and horizontally applying learning from Khan Academy to their product.

A project walkthrough with Chris showed how he started the project. He engaged students with complex Math content by using a problem as a hook. He started off with the students using sequential photography. Students took pictures of moving objects (using action shot app for iphone) and then they had a discussion around what was happening in the image. Students were then given the project with the tennis balls to demonstrate the different motions. However, they quickly realised how difficult it was to demonstrate motion accurately. That is when the students
needed and wanted to know the equations and Chris was effectively able to teach the Math. Students Nolan and Gabe gave a walk through of their project folder and previous work they had been doing with Chris and partner teacher Ady. The assessment was clear to see, for example graded tests to assess students understanding of the Math through the projects as well as deep student reflections.

Section 3: Assessment

3.1 Personalisation and mastery based approaches

Da Vinci Science school in Hawthorne, California has a mission ‘...exists to provide our students a rigorous, relevant and hands-on college preparatory education which emphasises science and engineering in a safe and supportive school family.’ It has many distinguishing features that reflect deeper learning. Alongside project based approaches the school also has a focus on academic rigour and students mastering key content. The school practices ‘Mastery-Based Grading’ (MBG). This approach measures the mastery of concepts or what they call ‘essential skills’. This gives students specific feedback about which skills they have mastered rather than just an average score. Therefore students and parents are able to identify where they need direct their learning and progress. In the exemplar the essential skill being tested is formatted
into an ‘I can’ statement: ‘I can analyse whether or not an organism is alive and defend my position based on the eight characteristics of living things.’ Students are tested at different levels of mastery from level 2, basic understanding to level 4 approaching mastery. In a high stakes education system like that in the UK with GCSE examinations for example, mastery based approaches to assessment within a deeper learning culture would be desirable. Deeper learning values the academic content of subject disciplines which can be assessed using mastery approaches. Innovative use of MBG within units of work that are interdisciplinary, experiential and have a focus on a final product of learning can be harmonious. By having an overview of essential knowledge, understanding and skills of academic disciplines, these can be learned through innovative curriculum design beyond the siloed teaching of individual subjects.

Furthermore, at Aveson school in Altadena, Personalised Mastery Learning\(^\text{22}\) has been developed. The school is featured in the book ‘Learning Personalised: The evolution of the contemporary classroom\(^\text{23}\). “Personalized Mastery Learning involves students in the decisions about their learning, even in determining when learning outcomes have been mastered. This collaborative effort creates an environment where students enjoy the freedom to explore personal areas of interest plus critically think about and apply different ways to better learn concepts or skills. And teachers can teach to the precise needs of their students.” Kate Bean and Sebastian Cognetta. Lessons observed at Aveson would often involve teachers working with individuals and small groups but also teachers ‘teaching’ content. Students are able to demonstrate mastery at their own time and place, essentially combining the definitions of mastery with personalisation.

At Thrive, San Diego, highly personalised lessons were observed. A math lesson taking a blended learning approach allowed students to work at their own pace and the teacher to make interventions using online platforms. Teachers create individual


\(^{23}\) Zmuda, Allison, Diane Ullman, and Greg Curtis. Learning Personalized: The Evolution of the Contemporary Classroom. Print
learning pathways using data to inform dynamic groupings within the classroom. Using a rotation model, instruction can be targeted at specific groups of students. These students are not necessarily grouped by age but flexibly based on understanding assessed via online platforms. This approach allows time to be freed up so students can work on project based approaches to learning. This aspect of learning is under the the approach of ‘learning to learn’ at Thrive. However, alongside personalised mastery and blended learning, students also ‘learn to do’ using project based learning with similar features of those at other schools in California. Students also ‘learn to be’ through 5 distinguishing mindsets: be compassionate, be mindful, be flexible, be solution oriented and be curious. The social and emotional aspects of learning such as collaboration, empathy, thinking critically, curiosity and resilience are also built into the fabric of school curriculum and assessment.

3.2 Assessment & deeper learning

For deeper learning to occur, students are assessed in more authentic and meaningful ways. At High Tech High there is a culture of exhibitions. Parents and the community are invited to regular evening displays of student work. Students have to present their learning to an audience which develops their communication skills and motivates them to understand the academic content of their learning. Working on large community projects and on internship programmes, means authentic real world assessments by adults in the real world. This is often formative and informal in nature for example, students working on the ReVision project with experts in the field. Exhibitions are always spectacular events and are predominantly student led, developing a culture of responsibility and excellence towards their work. At High Tech High, Chula Vista they have 3 festivals of learning each year, for example the ‘Festival del Sol’ brings student work together in a large celebratory event.
At Big Picture Schools and at Da Vinci, presentations of learning (POL’s) are commonplace. Several POL’s were observed on visits to schools in California. POL’s and other forms of assessment for deeper learning are well accounted in the book ‘Leaders of Their Own Learning: Transforming Schools Through Student-Engaged Assessment’ by Berger et al. POL’s at the Big Picture schools visited and at Da Vinci Science School had various different criteria and purpose. Parents and other family members are invited and expected to attend as students present and ‘defend’ their learning and progress. In the UK there is usually a tradition of parents’ consultation evening, where parents will meet several subject teachers for a small amount of time.

A POL gives students more ownership over their own progress and reflect deeply on what they need to do next. A parent may be involved in several POL’s, some of which observed were an hour long. A POL also gives an audience for student work and encourages them to prepare and communicate in a professional manner. One example of a POL was at Big Picture, Sacramento MET. The POL was presented to the student's advisory group, advisor and parents. A student panel assessed the POL against a rubric for public speaking. Students are assessed on subject

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knowledge, presentation flow, quality of slides and other visual aids for example. The particular presentation was an end of semester advisory POL. The student had to present and defend on academic progress, their internship reflection, community service project, a book review and cultural experience. At Da Vinci Science School, a week long drop down at the end of term meant students came and gave portfolio defence presentations to parents and their academic teachers. This was based on their ‘I can’ statements and aspects of mastery that was expected of them. This included subject specific questions so that the student had to think on the spot to defend the mastery of that subject discipline. For example, one POL involved a student solving a Math problem to demonstrate mastery in that particular content.

**Leadership and culture**

“Giving up control is the key to finding success as a leader, teacher and even parent in a school. First and foremost, you must trust the people around you”

Dr Nicole Assisi

**4.1. Collaborative leadership**

Dr Nicole Assisi and Shelli Kurth, the founders of Thrive Schools in San Diego have written about their own approach to distributive leadership. This was evident in my own visit to the school. Giving up control is a large part of their vision for the school. Teachers need to be trusted here in order to be experts in ‘Next Generation’ tools and to work collaboratively to develop their unique curriculum. Thrive school has a collaborative culture where colleagues learn from each other. Educators are entrepreneurial and take risks but find ways to do things better. Teachers share the vision and ethos of the school, and decisions are made democratically. Leadership responsibilities are rotated and everyone in the school can set an agenda. Trust is paramount such as decentralising budget responsibilities for example. Staff are employed to be part of a team and they are not micromanaged but trusted to make

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the right decisions for the children they care for. 360 degree evaluations of performance are a regular part of Thrive school’s culture of reflection and progression.

In practice, distributive leadership looks different to the traditional culture in secondary schools in the UK. For example, at High Tech High Chula Vista, teachers work collaboratively on a daily basis. The Power of Protocols26 (McDonald et al) gives a toolkit that allows people to work collaboratively but with the idea that under the right circumstances, working under constraint can be liberating. Protocols allow safe and honest feedback, allow complexity to be analysed without rushing judgement and allow interpretations of of complex text such as student work. At High Tech High educators and students will use protocols such as the ‘tuning protocol’ that gives a constraining amount of time to tune a proposal (e.g. a curriculum project) and feedback through warm and cool feedback. This is an integral part of innovative curriculum design and one that provides opportunity for deeper learning. An example of protocol in action was participated in at High Tech High Chula Vista. A charrette27 was used with a small group of 4 teachers to help the requesting team to improve student outcomes. A charrette frames a design problem and follows the process;

1. The work in progress is presented without a time limit.

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2. A specific request is made for example a particular focus of discussion such as next steps or how can we make this better?

3. The participants discuss while the team/individual makes notes and listens.

4. When the team/individual has got what it wants the discussion can be ended.

5. The process is reviewed.

So in the example of the charrette participated in, Britt Shirk and Regina Kruglyak framed the discussion around ideas for ‘plunges’ into the local community that will allow students to empathise with different ways of living. These ideas were linked the wider Tiny Homes project to enhance the outcomes of student learning and experience.

### 4.2 Schedules and advisory

For deeper and meaningful learning to occur, it is difficult to follow a siloed set curriculum. For example, in the UK, students usually have 25 lessons per week including, Math, English, Science, Geography, RE, History, Art, Music, PE, Technology and Languages for example. For students to follow highly personalised, cross-disciplinary and enquiry based units with authentic outcomes or to include rigorous internships, this model would not work. At High Tech High, there may be a focus on certain disciplines in a given year group. At Big Picture, students spend time with advisors and a small number of academic educators that enables strong relationships to be developed. Students will spend a significant amount of time in advisory. Students will develop close relationships with their advisor and advisory group. At Design Tech High in San Mateo, a new start-up, student schedules are remixed every week. This is based on student progress in class and students decide how they spend the day. Students will be working on projects within the community but the remixing of the schedule allows teachers to teach students more intensively when they don’t understand the material. The idea is to encourage students to be self-disciplined in meeting their own targets.
5.1 Interview with Rob Riordan

As part of my visit to High Tech High in California, I interviewed Rob Riordan that gives a profound insight into the conditions that lead to deeper, more meaningful learning at those schools. Rob Riordan is co-founder of High Tech High, San Diego and President Emeritus of HTH Graduate School of Education.

Me: As a teacher who wants to practice project based learning, how can you make it work under the constraints of exams?

Rob: One way that I look at it is that when we’re in a class that is focused on important content, our aim ought to be, in my view, for students to in some way transform the content. That it not be simply transmitted as inert knowledge, because if it’s inert it’s going to disappear pretty quickly. I mean within a couple of weeks after the exam.

So if we’re interested in retention of important pieces of the content or significant meanings from the content, then it needs to be transformed in some way.

Alfred North Whitehead wrote about this 100 years ago. He said that inert knowledge is not enough, and he also said, along the lines of the ancients, we should educate for the development of dispositions in the 20th century. Sadly, we have been reduced to teaching subjects. So, the question for someone who is on an exam course is that those courses are about content but they should also be about the development of dispositions. It’s a question about how do we balance the two. How do we ensure that our students are developing and growing around those dispositions of critical thinking, problem-solving and collaboration and so forth?

Me: Where there is high accountability, it is easier for a teacher to teach to the test, how do we overcome this?

28 http://gse.hightechhigh.org/people/?Rob_Riordan
Rob: It’s a leap of faith in a way to say: ‘I can be more effective and my students will do better on exams if I engage in a pedagogy that is more likely to result in retention.’ I would also say that we are also under some of the same kind of constraints in this country (USA) around this testing mania that we’ve been living with for last 20 years or so and, ultimately, at some point the pressure calls for resistance. It can be possible to at least explore ways in which to engage in a pedagogy that leads to transformation, even with exams and so forth. But, tellingly, the reverse side of the question is: where is the evidence that our current pedagogy is the most effective way of preparing kids for the exams and more than the exams?

Me: *I have seen some wonderful work at HTH and Big Picture – the internship programme for example.*

Rob: Larry Rosenstock and I worked in Cambridge, Mass for many years and I was his internship guy. So we did internships with the kids and I would go out on sites and teach humanities with the kids. It was basically a writing based exploration of their experience in the internship. But internship stuff is really powerful stuff, life changing for kids.

Me: *What would you say are the 3 most important ‘must dos’ of designing a new school?*

Rob: I think it’s important to begin with is a conversation about teaching and learning and what is really significant about it, and how our new school might, in its faculty (staff) and its programmes, be a place where significant learning is happening all the time. One can do that with a planning group simply by asking people to reflect on a period in which people really learned something in their own school experience or outside school and share those accounts, then extract from those accounts the elements of significant learning. Then say: what kind of programme will we need to for it to be like this most of the time? The programme would probably involve things that talk about having the new school be a place where students have access to important audiences for their work; a place where students are engaged in work that connects with the community; a place where students are known well by faculty (staff) – which certainly would have implications for the timetable; and a place where
everyone has standing, students and teachers, as members of the community. Those are elements of significant learning and you can begin the design from there.

So, number one would be to engage in conversations about learning and the kind of learning environment we want to have. When we opened HTH this led us to insist that we would not separate out kids by perceived ability and that we were going to have an untracked (un-setted) learning environment for all our kids. A second outcome is that it becomes really important to have a robust learning environment for the adults. So how is that going to happen? The way that happens here is that our teachers arrive at school an hour before the kids every day and engage in learning activities together.

Me: *I’m blown away by the level of social capital there is at HTH. I attended a tuning and noticed a whole community of practice.*

Rob: That was one of our design principles from the very beginning.

Me: *I can see many benefits of your flat structure but what are the drawbacks?*

Rob: That is a good question. I tend to think more of the benefits and think of the drawbacks being in traditional hierarchical arrangement. One drawback might be that sometimes it might be hard to know where authority rests and so it becomes an organisational task to figure out how decisions are both arrived at and implemented. It is really important to figure out how informally and formally we are going to engage in governance, how we decide and, once we have decided to do something, who is going to do it. That needs a lot of attention because the hierarchy isn’t going to decide it for you. On the other hand there are so many benefits. The big benefit of being horizontal is that everyone has standing.

From the very beginning we also knew that we didn’t want to isolate new teachers from veteran teachers in the way that many schools do. We want new teachers to be engaged with veteran teachers on the dilemmas of practice that they all face, and those dilemmas for us are triggered by our commitment to equity and diversity. We embrace this problem as opposed to when you separate them out, and the
pernicious effect of separating kids out by perceived ability – which often is a mis-perception of ability.

Me: What would you say to a traditional senior leader with fixed values on disciplinary knowledge? How do you mitigate the mentality of teachers who have ingrained values on the transmission of knowledge?

Rob: The teacher selection process is vitally important, so raises the question as to what you are looking for. Changing one's leadership approach is a very difficult process and requires a couple of different things. One is to try to engineer a change in context so that people can see things in a new way. This can be done through simulations or through initial meetings where the leadership is distributed or rotated. Meetings where there are group norms (or protocols) around how the group operates, ones which include equal sharing of the air and stuff like that also helps. It’s a long process. It involves deep conversations about what we want as a school. If we’re after significant learning that may imply a change in practice and what does that imply for teachers, and then how as a leader might one foster such a robust learning community.

You can’t mandate an adult learning community; you have to build it through consensual processes and processes of dialogue. Dialogical leadership is what we need to aspire to. How we get there is a challenge, though, especially from a background where it is seen as critical and effective to assume a hierarchical position. There are lots of leaders who could not function at HTH but who are very good leaders in other contexts. It’s a matter of matching as well, you wouldn’t want to bring in a good hierarchical, charismatic guy and ask him to shift the way he deals with things and lead us at HTH, it’s not going to work.

Me: So the second part of the question for example was about a teacher having a passion about their subject, e.g. History, and feeling students need to have certain aspects of Historical knowledge.

Rob: What follows is kind of a joke, in a way, so it’s not serious – but it is.
Every year we ask our directors in a meeting to think about their own teachers and to rank them on a four point scale: 4 is someone who is indispensable; 3 is someone who is a really solid contributor; 2 is someone who is growing; and a 1 is someone who the place would be better off without. No names, nothing like that, but what does your staff look like, how many 3s do you have and so forth. In one meeting, as a joke, I said: “Well in terms of the History teachers, if you’re a 4 your students are making History, if you’re a 3 your students are doing History, in other words being Historians, if you’re a 2 your students are learning History, if you’re a 1 you are History.”

Someone who is really passionate about content, that’s a really good quality that can lead us to interesting projects with kids because kids can get swept along with teacher passion. If the passion is only about the content and not about the process of doing History then we get into trouble a bit. We want teachers who are interested in engaging students as Historians, doing oral History etc. There is another way of looking at it. When we bring in candidates for a position, they teach demonstration lessons. What I’m looking for is someone who wants to know what and how kids think, as opposed to someone who has some content that he/she wants to transmit. The lesson with a bit of content and a bit of a quiz or test at the end, that teacher is not going to work well at HTH. If we find a teacher who engages kids in conversation, maybe doesn’t have a lot of classroom management skills, whatever, we hire for attitude and train for skills.

Secondly, for building a new school, it’s critical for the adults to work together well in order to create a healthy environment and also to model that for kids. When we are hiring, we will bring in 40 teachers on a day and at the end of the day put them in groups of four around tables. We give them a provocative text to read and say: “Your job as a small group here is to understand the text more deeply and share the air.” We rotate into the empty chairs and listen to the conversations. It is really important for us for our teachers to be good collaborators. We have had some competent teachers but with little relationship skill or agency with colleagues, who were disruptive early on in the school. They were not rehired.
Me: What does your title mean, emperor of rigour? And what does rigour look like in PBL?

Rob: I had a position here before I became Dean of the Graduate School of Education. I was a roving critical friend. I taught for 25 years. I was in classrooms all the time, talking about what I saw and then doing video and that kind of work to take to the directors to raise questions – not just about how we teach but also how we talk about teaching. So, as a roving critical friend nobody reported to me, I didn’t report to anybody, and at one point some conversation said ‘well what is your title?’ So I said ‘Emperor of Rigour’, Emperor because it’s kind of an eyebrow raiser around the notion that people have around hierarchy. We are very flat so if it’s hierarchy you’re expecting then I’m the emperor. It was just a joke in a way. I wanted to engage people in discussions about rigour and that rigour is not about complexity of content, or volume of content. It’s about the decisions students make moment to moment, to go deeper. It’s a process issue, not a content issue. My rules for rigour are:

- No rigour without engagement
- No rigour without ownership
- No rigour without exemplars
- No rigour without audiences
- No rigour without purpose
- No rigour without dreams
- No rigour without courage
- No rigour without fun.

I think these are the pre-conditions for rigorous work. That’s why I call myself ‘emperor of rigour’, because I want to engage people in what it means.

Me: In the UK our students have an exercise book where all their notes are written. Some teachers will spend an inordinate amount of time marking and giving feedback, www’s ebi’s etc. Students might then be expected to ‘follow up’ on the
feedback with a green pen. How do you think students should write and how should feedback be given?

Rob: I certainly think that students should have thorough and thoughtful feedback on their work. I think also that we are trying to develop self-directed learners, reflective learners. We are trying to enhance students’ metacognitive capacities and that comes about through practice. If we’re doing learning 2.0, why would we want to assess it using the means of assessment 1.0 and what would assessment 2.0 look like? It’s about reflection and dialogue. It doesn’t mean kids never write essays, but when we talk about our learning environment and the learning kids are doing, it’s important to us that we engage in dialogical assessment.

I encourage people to let the assessment start with a statement by the student and to let the assessment not only include the performance of the student but also the context in which that performance took place. The first item on the assessment sheet, a student led comment, should be ‘What in this experience worked well for you and what didn’t work well? And then tell us about your performance, what was your best work, what your strengths were, what your needs are etc’. Students write that up and then the teacher responds and agrees, disagrees, adds other comments that the student hadn’t considered. In some cases here, that document goes to parents, through google.docs and the parents are invited to comment. It’s a cycle of dialogue that is initiated by the student. That’s my thought on how we might get to thorough and thoughtful feedback but in a dialogical mode that fosters self-direction.

Me: Along your journey of starting HTH would there be anything you would have done differently or any mistakes you have made?

I think of it less in terms of mistakes and more in choices and roads taken which meant that other roads were not taken. One choice we made early on in the interests of an equitable environment was that we would do age grading. I taught for many years in which we did not group kids in that way and I would have 9th and 12th graders in the same classroom and could not have imagined teaching in another way. Sometimes I’d have 9th graders who were quicker or more experienced in some respects than some of the 12th graders. We did age grading here but one way
to get rid of this is to have an elective system where students choose courses. However, we felt that if students choose courses then they would self-segregate and that males would take courses in mainly tech etc. We decided we were going to have Humanities 1, 2, 3, 4 and all the students were going to take them. We would move choice inside the courses. What it meant was that we didn’t do as much as we might have around cross-age learning.

I’m happy with our choice around all of our students doing internships in 11th grade. We chose this because, especially for students whose parents had not gone to university, it is in the internship that they realise that they want to and need to go to college. Working alongside a mentor they realise they need to go to college to achieve that position. When the mentor says it, that’s when it sinks in. Internships are better college prep than college prep. Plus, for first generation kids it is at this age that they are beginning to form their adult world networks that more affluent kids already have. The internship is a way for those kids to form connections. Their mentor will write recommendations for them into university, they are going to connect them to other job possibilities and so on. The decision to do internships was the right decision, but we did not structure them in the way we might have. It took us a long time. We originally did it two afternoons a week and the kids were not coming back saying their lives had been changed. If they went on a two-week trip to Ecuador, they would come back and tell us about it. We were not getting that kind of testimony and we realised, about 7 years in, we needed to make the internships an immersion. So we changed it to 3 weeks or 4 weeks where the kid goes to the workplace and doesn’t come to school. Now we are getting that testimony because the kids are there, experiencing it. We hold mentor luncheons about work and life in the adult world and how to align with the kind of questions we ask them. Students also create a project and expectation of some serious and significant work out of the internship and also have a 1-1 mentor.
Conclusions

For deeper learning to happen, the conditions need to be created to allow for innovative approaches to curriculum design, assessment and leadership. Some of these conditions have been studied in the finite number of schools in this research project. Rob Riordan in ‘Seeing the Future a planning guide for high schools’ gives a set of design principles to help schools rethink how learning can be connected to the real world. There are six design principles, personalization, adult world immersion, intellectual mission, contexts for reflection, community partnerships and teacher ownership. The idea is that when these principles are implemented fully, disengagement and isolation are eliminated. More recently, XQ: The Superschool Project is rethinking how school students learn in the USA through the design of an initial 10 superschools. There is a need for contextualised approaches to deeper learning that support students in specific localities. There is a need for innovative curriculum design that leads to choice and personalisation and assessment practices that support all students. For this to happen new forms of collaborative leadership and educator empowerment need to happen. Both existing schools and new free schools need to respond to the challenges facing contemporary life. From this research, deeper learning occurs when;

- **Learning is project based**: These opportunities are built on strong teacher and community collaboration. Students work towards authentic products of learning that have a wider impact in their localities.
- **Intergenerational learning is commonplace**: Students work with adults and the wider community to solve authentic problems facing their localities. These are strong reciprocal relationships that are developed over time.
- **Students have deep and meaningful internships** that enable them to see the big picture of education, college and careers. These are enabled because

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30 https://xqsuperschool.org/
they are a crucial part of the curriculum and a significant amount of time is given to make internships effective.

- **Learning is highly personalised** to the individual using data effectively when appropriate. The curriculum and assessment models are carefully designed and disrupt traditions such as timetabling and same age class groups. Timetables are flexible and students work with students of different ages forming a stage not age approach.

- **Students are able to master key knowledge, understanding and skills** of academic subjects. This is built on rigorous approaches to assessment within project based and innovative curriculum designs. Newly acquired knowledge and skills are applied in different scenarios which leads to longer term retention.

- **Students are authentically assessed** beyond traditional means. Approaches such as testing are used but so are methods such as exhibitions and POL’s so that students are accountable for their own progress. Relationships and means of assessment beyond the teacher and the classroom are implemented. High porosity between the school and outside educators in businesses and the community leads to effective means to assess students in powerful ways.

- **Leadership empowers and trusts educators** to design deeper learning opportunities through collaborative approaches to CPD and curriculum design. Schools have distributed and collaborative leadership structures that are usually non-hierarchical. The collective human and social capital is embraced which leads to strong outcomes for students.

- **Learning is interdisciplinary** and allows students to make links between their learning. Project based approaches to curriculum design leads to deeper cross curricular units of work. Flexible timetables and open learning spaces allow for creative curriculum design that thinks beyond the silos of individual disciplines.
Recommendations

In the UK context there is a need for systemic change that leads to deeper learning opportunities for our students.

The government programme for Free Schools and Multi-Academy Trusts (MAT’s) is an opportunity to design radically new curricula, assessment and leadership approaches. For example the proposed ‘Infinity School’\(^ {31}\) is an example of how deeper learning practices can be applied to the design of an innovative curriculum model in the UK. This model is built on four design principles, *a common intellectual mission, personalisation, authenticity and educator as designer*. The school’s ‘pedagogical core’ has been developed from OECD's Innovative Learning Environments 2013\(^ {32}\). This report provides a robust framework on which to base innovation in the design of schools and is thus fundamental reading. The proposed Infinity School has also applied deeper learning strategies from across the globe to its own innovative model. New schools such as XP School\(^ {33}\) in Doncaster and School 21\(^ {34}\) in Stratford are already disrupting the traditional approaches to school design in the UK. By embracing and imitating these already proven successful models of schooling, new free schools can be designed to increase opportunities for deeper learning across the system. Furthermore, the Innovation Unit’s School Design Lab\(^ {35}\) works to support the development of extraordinary learning in new and existing contexts. Expertise exists in the UK to enable the development of exciting and innovative free schools and MAT’s.

Existing schools, should review and reform their curriculums by working with existing support networks in the UK. However, new forms of CPD and collaborative leadership practices must be implemented for innovation to be sustained. This must be achieved through empowering and trusting teachers through collective decision making and cross curricular curriculum design. Methods such as ‘design thinking’

\(^ {31}\) [https://infinityschools.org/](https://infinityschools.org/)
\(^ {32}\) [http://www.oecd.org/edu/ceri/innovativelearningenvironmentspublication.htm](http://www.oecd.org/edu/ceri/innovativelearningenvironmentspublication.htm)
\(^ {33}\) [http://www.xpschool.org/](http://www.xpschool.org/)
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and ‘improvement science’ can be implemented to drive significant change in stagnant curriculum models. David Price in this blog post⁶⁶ argues for a shift from ‘privatised practice’ (common in schools in the UK) to a culture of ‘open learning’ that drives improvement. “Schools who commit to cycles of continuous improvement are more likely to see sustained long-term, performance gains. More than that, however, is the prospect of schools becoming collaborative centres of open learning, sharing what they’re learning in an open culture, where access to internal knowledge is free and practitioners are trusted to find their own solutions.” The Design Thinking for Educators Toolkit⁷⁷ gives a process to help design meaningful solutions to classroom based issues. Furthermore, it is recommended that schools implement opportunities for teachers to work together in the design of curriculum projects. Using tools mentioned in this report such as protocols to structure collaboration can be a powerful means of generating ideas and saving valuable time.

New schools have an opportunity to develop new ways of leadership beyond the traditional hierarchical approaches found in most schools. Collaborative leadership approaches should be researched and implemented. The book ‘Flip the System’⁷⁸ by Jelmer Evers and Rene Kneyber researches democratic approaches to education and includes case studies where and how this is happening. It makes an inspirational starting point for the design of new leadership models. For transformative student outcomes to happen, collaborative leadership structures that enable teachers, parents and students to engage with and shape school culture and processes are needed.

As a starting point, some of the most powerful aspects of deeper learning can be implemented relatively easily in existing schools. Schools and educators should incorporate authentic and student led methods of assessment such as POL’s and exhibitions. These can lead to far greater outcomes for students because of the accountability associated with presenting to an authentic audience beyond the teacher and classroom walls. At the same time as implementing approaches to

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⁶⁶ http://engagedlearning.co.uk/why-what-works-doesnt/  
⁷⁷ http://www.designthinkingforeducators.com/  
⁷⁸ Evers, Jelmer, and René Kneyber. *Flip the System: Changing Education from the Ground up*. Print.
curriculum design such as Project Based Learning, teachers should also consider the academic knowledge, understanding and skills through rigorous forms of assessment. Mastery based grading approaches for example should be incorporated alongside the development of curriculum projects. In existing schools, the implementation of small scale projects would be advisable that could lead to an organic revolution in the core school curriculum. There is a need for all schools to become community focussed, where parents and folk educators are involved in the creation and delivery of school curricula.

Careers education also needs to be transformed to enable deeper learning experiences in the world of work. Space and time for students to experience meaningful internships not only helps them develop new and authentic knowledge and skills, but transforms aspirations.

Broader teacher professional development such as teacher training should include courses related to deeper learning. This is to ensure future capacity for innovation and deeper learning practices to be integrated into the school system. Misconceptions about deeper learning approaches need to be challenged and modern forms of curriculum design and pedagogical approaches such as enquiry need to be understood.

Next steps

The findings described in this report will be disseminated in a number of ways. Firstly, the author will use influence to develop interdisciplinary approaches to the curriculum within a whole school leadership role. The school is developing a ‘Connected Curriculum’ that enables students to make deeper connections between their academic subjects. This involves aspects of Project Based Learning where students will exhibit their learning to the wider school community. The Connected Curriculum also provides opportunities to engage in deeper learning by working
closely with the University sponsor. The findings of this report will enable new ideas to be generated using collaborative approaches to leadership.

Secondly, the findings will be disseminated to wider audiences such as at an event organised for educators around progressive and deeper learning approaches. This report will be actively shared through attending networking events and through personal learning networks such as through social media.

References

Berger, Ron, Leah Rugen, and Libby Woodfin. Leaders of Their Own Learning: Transforming Schools through Student-engaged Assessment. Print.


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