# Paradigm Shift of teaching and learning in the 21st Century

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Paradigm Shift of teaching and learning in the 21st C

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# Why did we need a Pedagogical Framework?

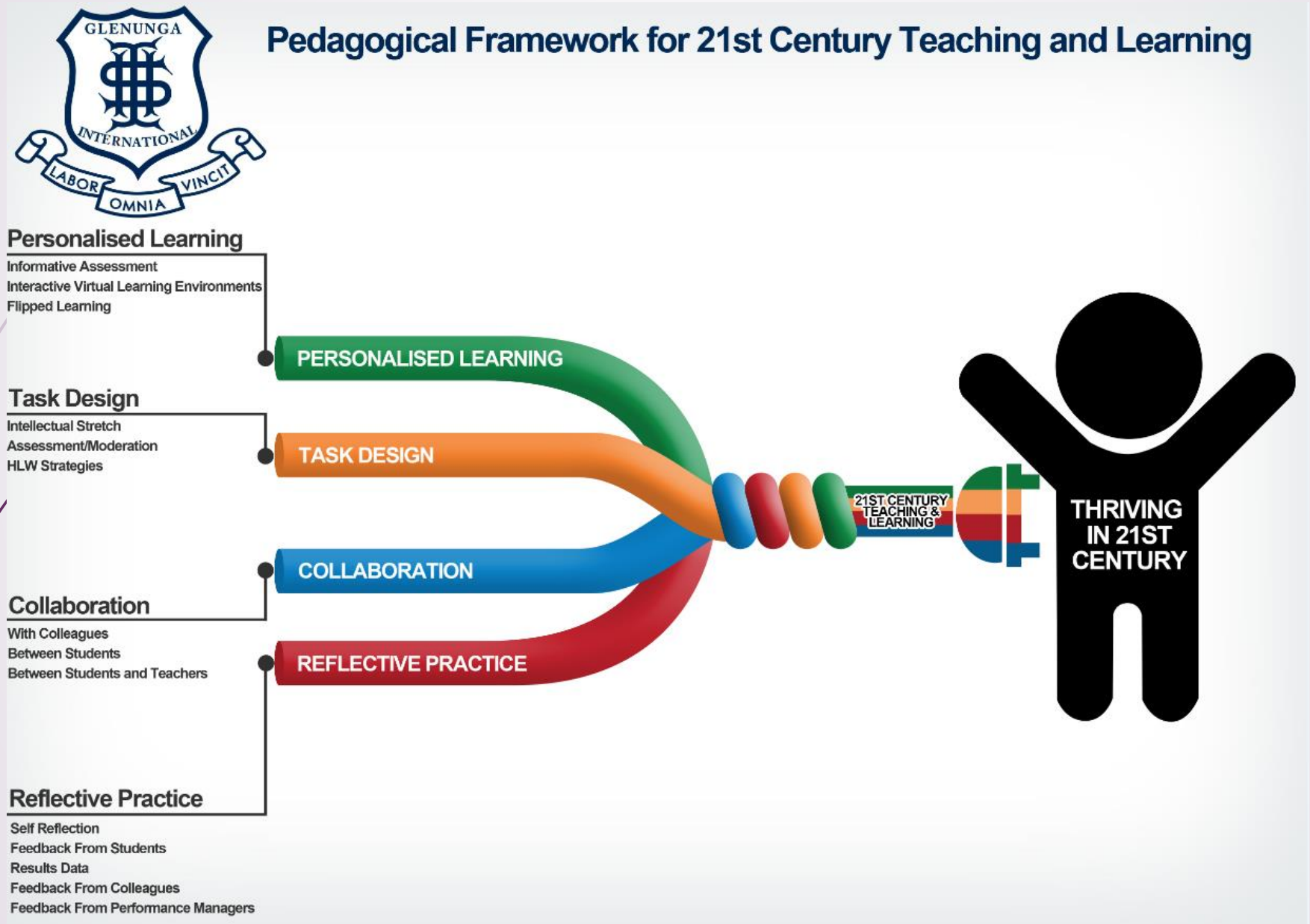
Achieving excellent results for SACE and IB graduates however:

- Subject content focus rather than skills for learning
- Teachers doing most of the critical thinking
- Highly scaffolded tasks
- Cross class difference
- Individual silos
- One size fits all

# So what did we do?

- Innovative pedagogies team
- Best practice (CK and PCK)
- What changes would have biggest impact?
- Consult with staff- iterative process
- Feedback critical for buy in
- Consensus
- Develop professional learning program- each essential practice

# Pedagogical Framework for 21st Century Teaching and Learning



# Collaboration

- With colleagues- sharing or individual
- Between students- expected that they knew how to do it
- Between students and teachers- shift in power

# Cooperation or Collaboration?

A

B

C

Individual

Cooperation

Collaboration

Record any observations you make about the actions of characters that relate to collaboration (or lack thereof) in the boxes

Place the letter on the continuum where it best fits

TV
PG
L

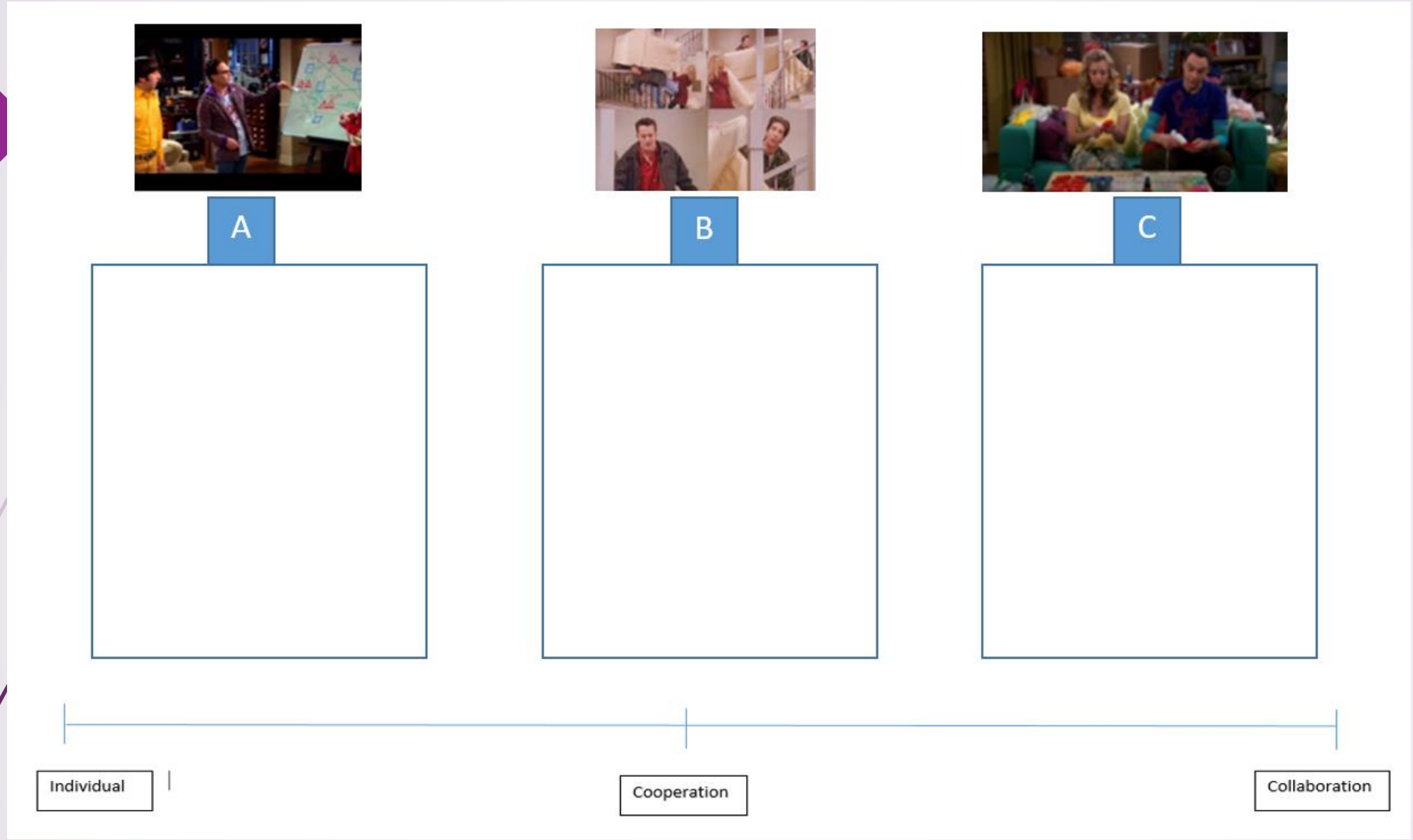
1:30

EXIT

1:30

tbs

1:30




Compare with colleague

- next to you
- In your group

Which one best represents Collaboration?

# Collaboration

1. What?
2. Who?
3. How?
4. Outcome?

- Your personal definition (5 minutes)
- Share definition with colleague/ person sitting next to you. How similar/ different is it to yours? (2 minutes)

# Task Design

- Intellectual stretch
- HLW strategies
- Assessment and moderation
- Initially summative tasks
- Teaching and Learning cycles- In and Out of Class Learning

# Identifying the intellectual challenge of a task

Tick the statements and circle the verbs that best describe the intellectual challenge of your task.

| Task | | The task… | Student thinking |
|---|---|---|---|
| | Low intellectual challenge | ■ Is highly predictable – no uncertainty<br>■ Asks closed questions<br>■ Focuses on only one right answer or way of approaching<br>■ Has a step by step process with explicit instructions<br>■ Focuses on recall, memorisation of facts or procedures | Name, Draw, Find, Label, Define, Match, Memorise, Recall, Measure, Retrieve, State, List, Describe, Research (look up) |
| | High intellectual challenge | ■ Is not predictable<br>■ Asks open questions<br>■ Allows for multiple ways of approaching the task and may have unpredictable solutions<br>■ Allows for decisions to be made on how task can be approached<br>■ Provides opportunities to apply knowledge to new situations or unfamiliar contexts<br>■ Requires metacognition – thinking about their own thinking | Compare, Contrast, Analyse, Apply, Evaluate, Sequence, Distinguish, Criticise, Classify, Organise, Question, Research (how), Form an analogy, Explain why, Identify, Devise, Connect, Prove, Theorise, Hypothesise, Formulate, Justify, Design, Explain how, Argue, Generalise, Reflect, Create, Compose, Construct, Infer, Conclude, Reason, Synthesize, Manipulate, Relate |

Notes

# GIHS TEACHING AND LEARNING CYCLE

## Stage 2 Biology- Completion practical (Conditions Affecting Enzymes)

**Learning Objectives** **What do we want students to learn?**

### Learning Intention

Students will:

- investigate the structure of DNA and the processes involved in the transmission of genetic material to the next generation.
- develop an understanding of how genetic information is expressed in cells and organisms
- relate gene expression to protein production and the many roles that proteins have in a functioning organism
- carry out a practical investigation relating to enzymes and apply their content learnings to the final report
- introduce students to the scientific method at Stage 2 level while exploring the concept of enzyme specificity and reactions
- develop critical thinking skills as part of the assessment process

### Reflective Practice

Student feedback

- Google Form part way through and at the end of the task

### Teacher Reflection on cycle

Things that went well:

- All students who used the vodcasts achieved at a minimum "B" level against the performance standard

Things that could be improved:

- More time for the validation practical- give students opportunities to manipulate and use the equipment under time pressures in at least one lesson prior to the practical.
- More resources- there were not enough water baths for the students to use without affecting other groups. There needs to be one carton of milk per group.

### Exploring the Key Ideas

What students already know

- most students have completed Specialist biology and Stage 1 blology so the following content should be revision: Structure of DNA, enzyme/ substrate complex, induced fit model, cell structure and function of organelles, receptor proteins.
- All students have completed practical reports in previous years, all at varying degrees of success.- Introduction, aim, hypothesis, variables, method, safety, results, discussion, conclusion

Big ideas or questions

- All enzymes are proteins, but not all proteins are enzymes.
- How do enzymes improve the efficiency of the cell? What factors affect the reaction rate? How can the knowledge of how enzymes work be applied to real world contexts? How does the structure of protein relate to its function? Why is reducing activation energy so important?

Explicit instruction and key skills

- Vodcasts set out the requirements of each stage of the practical report. Examples were given for each stage and key points were made that students were able to use as a scaffolding tool when writing their report. Students were taught how to use the vodcasts to improve their outcomes.
- Students were taught the skills of providing "critical peer feedback" so that they were able to look at peer work against a criteria and provide meaningful feedback to move the learning forward.
- The Stage 2 Biology Google site contains explicit information for each topic in the form of google slides and videos that are relevant for students to use to show application of knowledge in their final report

Immersion in resources

- Students use the Google site to develop their independent learning.
- Resources include short videos relevant to the proteins and reaction rates, interactives that allow students to apply their understanding in a fun way and also receive timely feedback on their learning and understanding

## Assessment of Learning

How will students demonstrate their learning?

Formative assessment

Checking for understanding strategies including:

- think-pair-share
- strategic questioning- using higher order thinking skills- why? how?
- mini white boards to write responses to questions in class
- gallery walk
- 3 way summaries- response to the question: 10-15 words,30-50 words and 75-100 words long to respond to the same question
- 3-2-1: 3 things you didn't know before. 2 things that surprised you about the topic, 1 thing that you want to start doing with what you have learned.
- Quizlet- quizlet live
- kahoot- student made
- validation practical- application of experimental skills in class

Summative assessment

- Task Descriptions:

Completion practical- individual report 1500 words maximum- feedback on draft by appointment

Peer and self assessment

- Self assessment of practical report against the criteria
- Peer feedback on the practical report discussion- google doc
- Self-marking quizzes online providing immediate feedback on understanding

Feedback

- meeting times were booked to discuss particular aspects of the practical report that students
- Detailed feedback via Google Classroom on summative assessments

4 Cs

- Collaboration: group decision making for preparing and carrying out the practical, collecting results and analysing results as a group by pooling group research and understanding
- Critical Thinking: assessing the impact of temperature and other factors on the enzyme, problem solving during the practical, reflecting on errors and improvements
- Creativity: not assessed in this task
- Communication: correct format and structure used for the report. Use of appropriate terms, conventions and representations. Coherent communication of biological knowledge and understanding

## Teachers Working Together With Students

Collaborative problem solving

- Students work in groups to answer past exam questions and give reasons for the responses. The group needs to come to a consensus after debating and be willing to share their thinking to the larger group for critiquing.

Critical Thinking

- Students use the writing Practical reports vodcasts to self assess their report. They identify areas that are lacking in the criteria required and make the necessary changes.
- Students provide peer feedback to at least 2 other students- Discussion section of the practical report. This gives the students opportunities to see how other students have written their report, they analyse whether it meets the criteria. Students use this learning to improve their report

Practical report skills:

- some concepts in the report were explicitly highlighted and explained- uncertainty, precision, accuracy, validity. Students applied this learning in the writing of the report. Vodcasts were used to provide additional support for the students

Exploration of topic, experimental skills:

- hands on activities and experiments- amylase and crackers
- validation practical that students use to trial new equipment ready for the summative task

Flipped Learning

- Google slides, weblinks and youtube clips were given to students to watch, research and note ready to bring ideas to class to use in an activity directly related to the learnings.
- Quizlet used for summarising terminology and personalised, asynchronous testing and revision
- Google Slides and weblinks studied in advance

Near and Far transfer

- Near transfer: terminology testing, memory of basic content- structure of DNA, structure of proteins, protein synthesis
- Far transfer: application of content in unfamiliar contexts- past exam application questions, open ended questions that had multiple entry and exit points
- Far transfer: students draw diagrams to represent their understanding of the concepts covered (concept map) and their links and possible applications to other concepts

Open ended questions

- Why and how do some genetic diseases impact on protein production?- student led research into Tay-Sachs, Sickle Cell Anaemia, PKU
- How could the results you obtained be used to further research the concepts? What could be done to make the data more useful?

4 Cs

- Collaboration: past exam deconstruction and responses
- Critical Thinking: peer and self assessment of the practical report
- Creativity:
- Communication: oral class responses; written responses to short questions and extended responses; reflections on learning in feedback to teacher

# Personalised Learning

- Dylan Wiliam Big 5
- Formative Assessment
- Once you know where students are at, what do you do then?
- Flipped Learning
- Interactive VLE's

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# Reflective Practice

- Self reflection
- Feedback from colleagues
- Feedback from students
- Results data
- Feedback from Performance Manager



## WHEN NICE WON'T SUFFICE

**Honest discourse is key to shifting school culture**

**By Elisa MacDonald**

How is it that a teacher leader who has followed all the recommended steps to ensure collaboration with his or her team — establishing a SMART goal, studying instructional strategies, administering assessments, looking at assessments with a protocol — still encounters superficial levels of discourse that do not move beyond the "culture of nice"?

Consider the following common snapshot of a team:

Pat Carter leads a team of teachers that has set a goal to improve student writing. The team meets twice a month, has discussed articles about literacy and implemented literacy strategies, and is for the first time looking at student work. Carter uses a protocol to guide the discussion and asks her team, "What do you notice?"

One teacher responds, "I notice that the presenting teacher is a really good teacher." Others agree and share more compliments, asking if they can borrow the teacher's lesson.

Although Carter has led the team through the appropriate steps for successful collaboration, her team's discussion is censored by the culture of nice — the underlying culture that inhibits the team from reaching a level of rigorous collaborative discourse where teachers are challenging each other's and their own thinking, beliefs, assumptions, and practice.

The act of analyzing student work, like discussing other sensitive topics such as race or student equity, requires teacher leaders to foster a vulnerability-based trust (Lencioni, 2002). Teachers must be willing to expose their struggles and failures with their colleagues, and colleagues must be willing to tell the truth, or teams will go through the motions of collaborative inquiry but never see results.

### THE ROLE OF THE TEACHER LEADER

Through skillful facilitation, the teacher leader can unearth cultural issues that lie beneath the surface and stand in the way of change. If a team collaborates without addressing and working to shift the culture of nice, the teacher leader puts the team at risk of gaining no insight into its own practice, obtaining no results (or unsustain-

# 21st Century learning at Glenunga

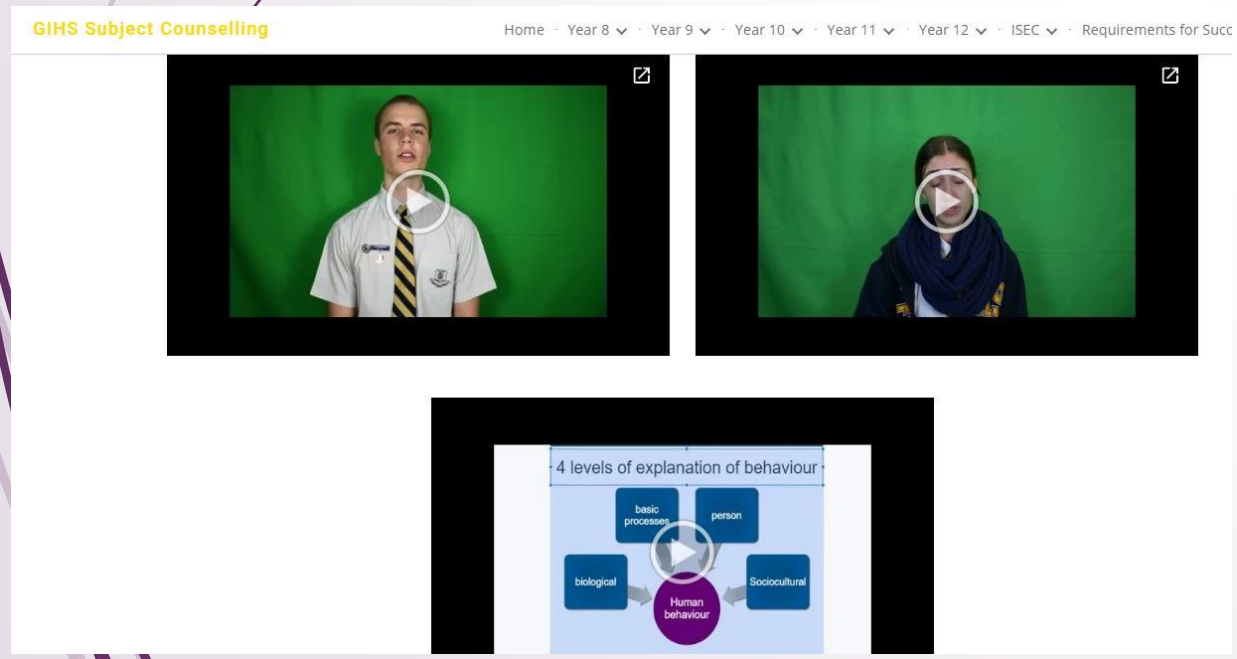
Presented by Olivia and David on behalf of the 21st Century Learner Council

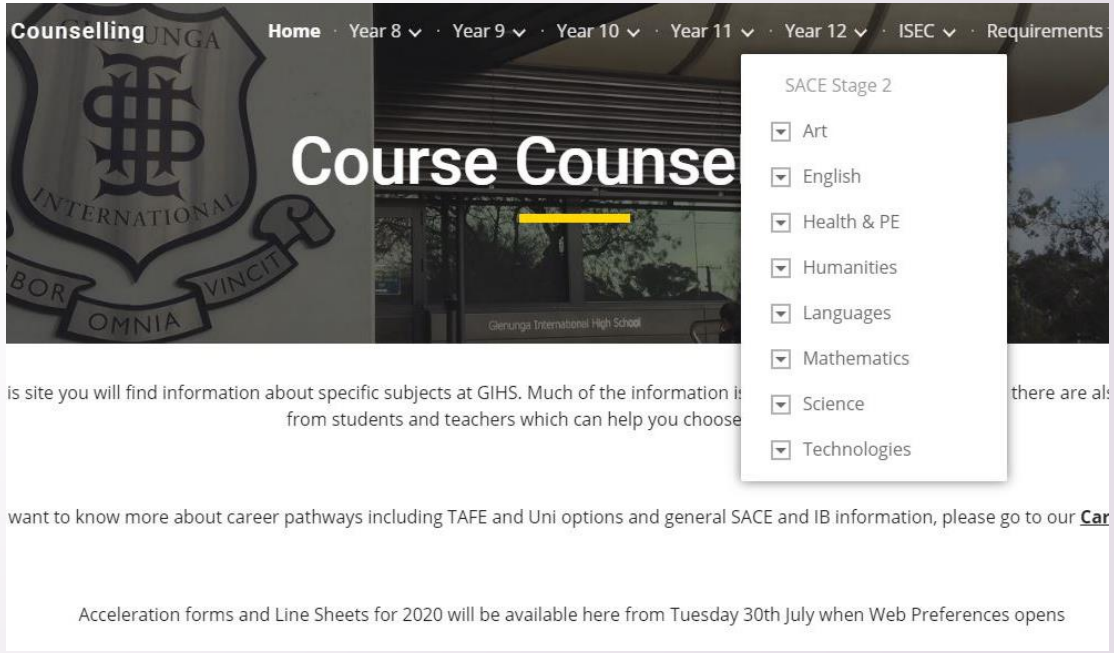
# When you think of the future of our current students, what do you see?

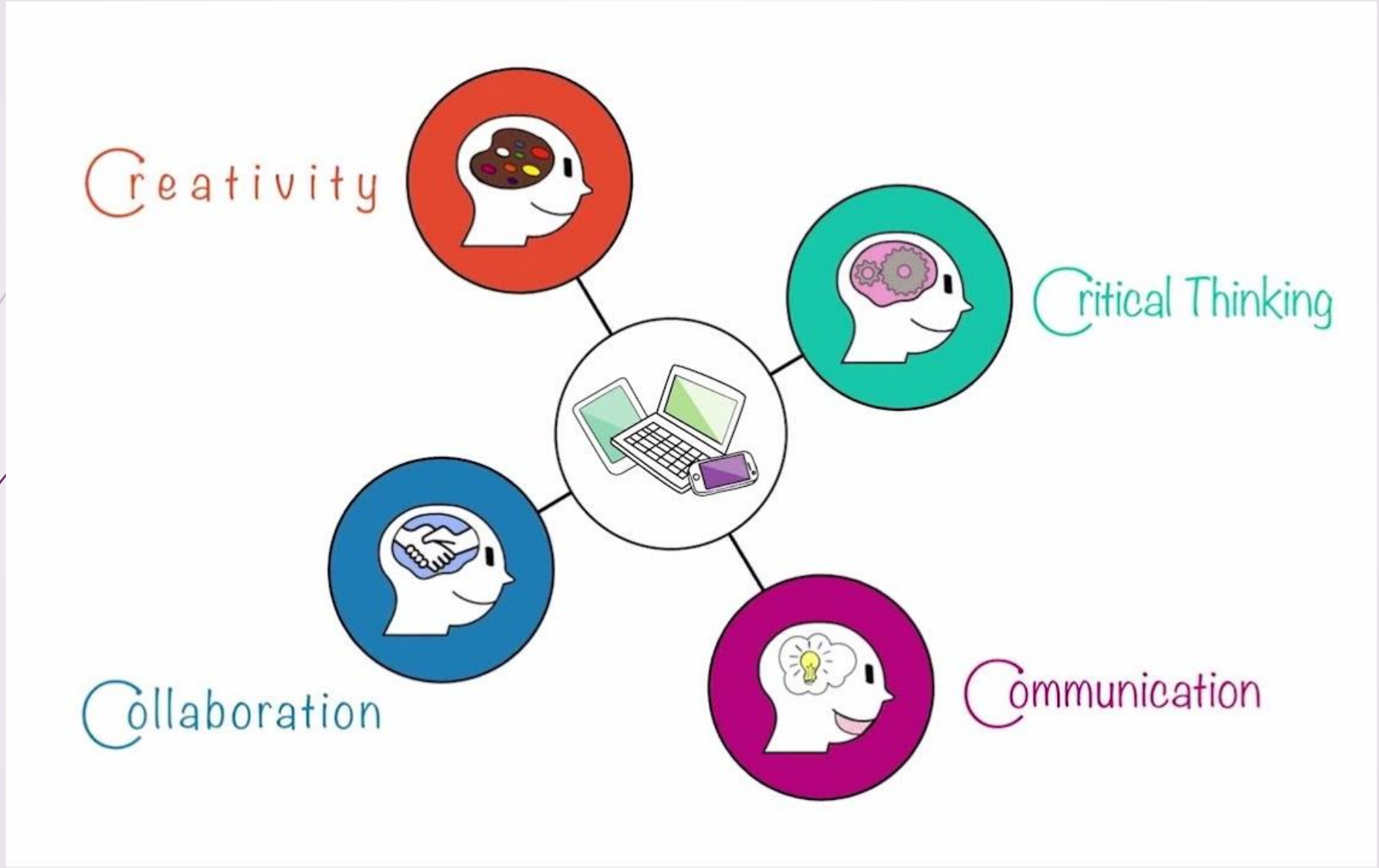
# How have we done this?

# Subject Counselling Website

- Provides extensive information on each subject
- Purpose is to help students make a more informed decision on their most suitable career path
- Provides an insight into career paths

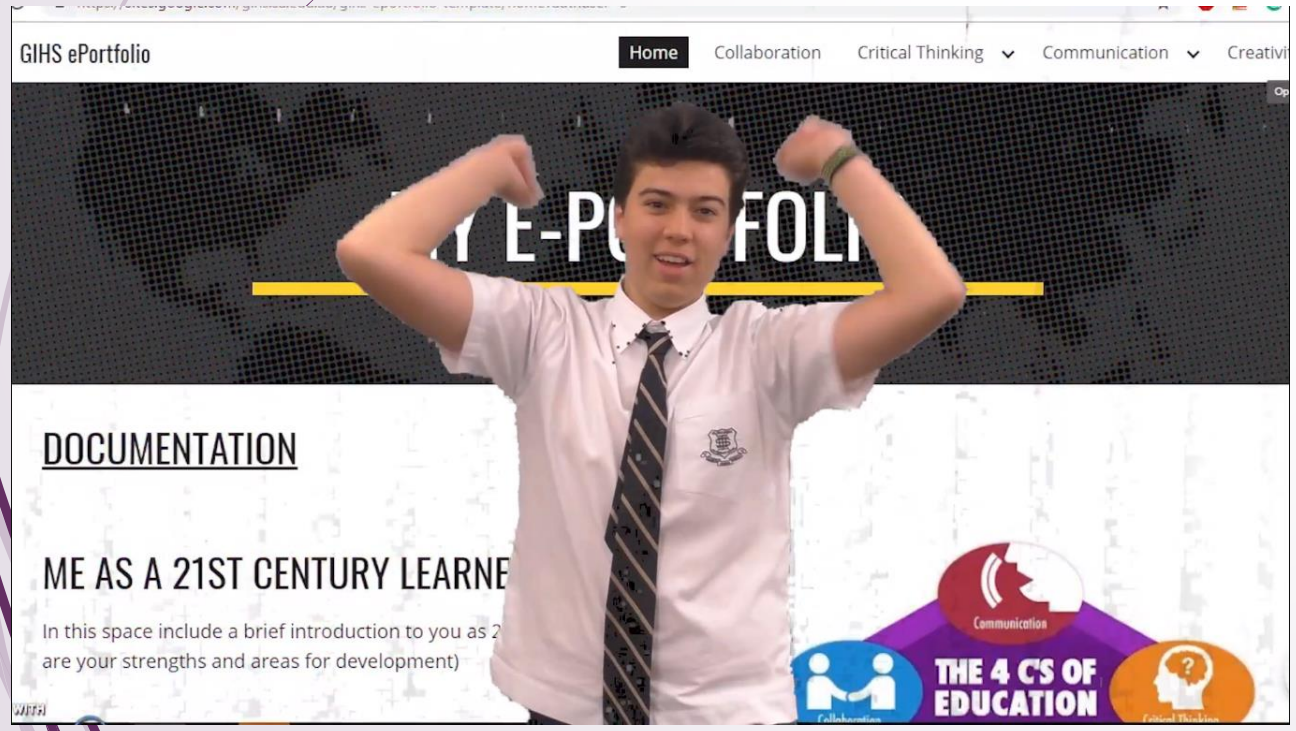


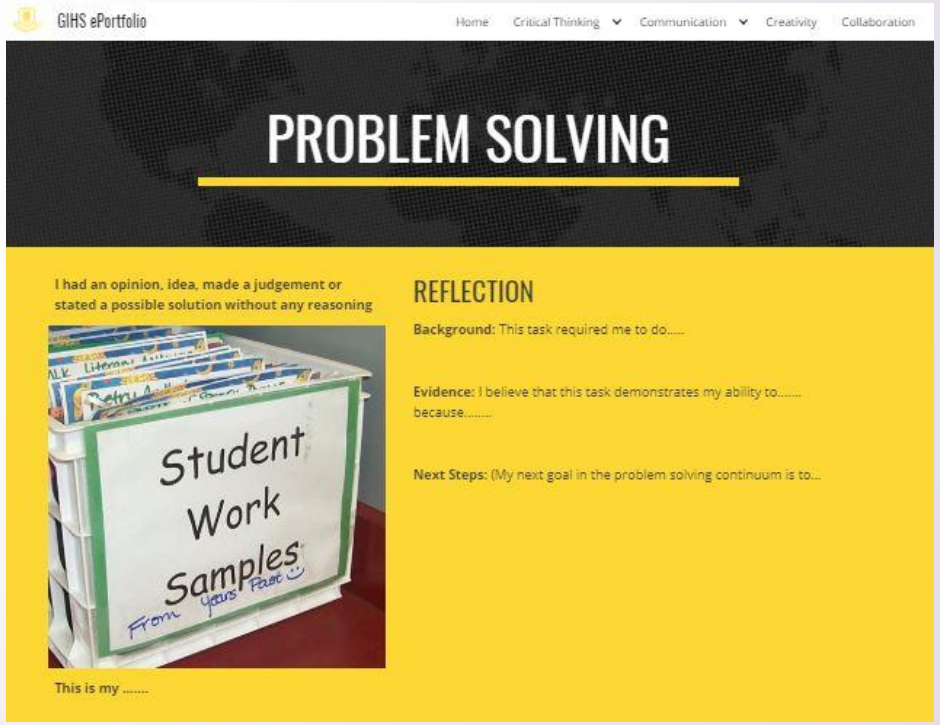




Creativity
Critical Thinking
Collaboration
Communication

# Eportfolios

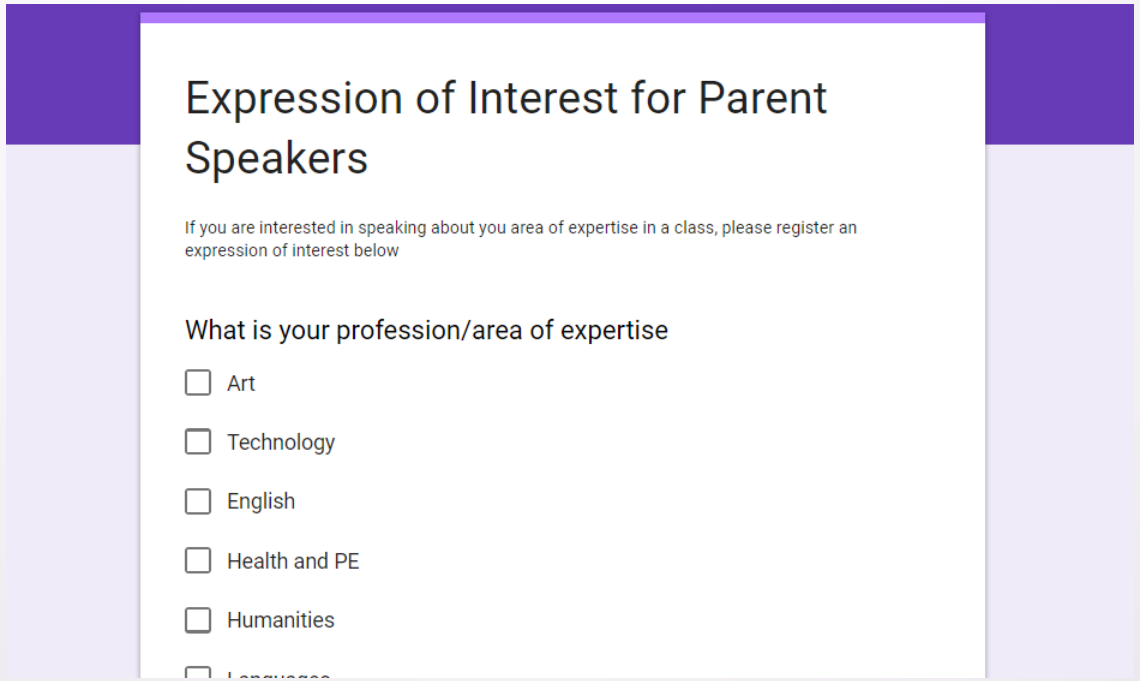
- Area where students can document examples of their development of the 4Cs
- Can be used as a resume for future employers



# Parent App

- Allows parents to submit an expression of interest to complete a class talk in their area of expertise
- To engage parents in their child's school and learning
- To be implemented in the coming weeks



# Feedback at Glenunga

Feedback obtained through:

- Whole class conversations (informally)
- In class individual conversations
- Google Forms/surveys

- Importance of reflecting on the feedback
- Anonymity can increase amount and quality of responses
- Strong teacher-student relationships
- Use in other areas of school improvement

# Student Autonomy

- What is it?
- Why is it important?
- Role of the teacher
- Personalised learning

# So…

# WHEN YOU THINK ABOUT THE FUTURE OF OUR CURRENT STUDENTS, WHAT DO YOU SEE?

# Teacher Introductory Vodcast

# Thank you!