

Developing the next generation of agile students through Vertically Integrated Projects

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What is the Vertically Integrated Projects for Sustainable Development (VIP4SD) programme?

AND



How does it help make our students more agile?



In VIP UG students work in teams

With students from other years of a course

With students from different disciplines

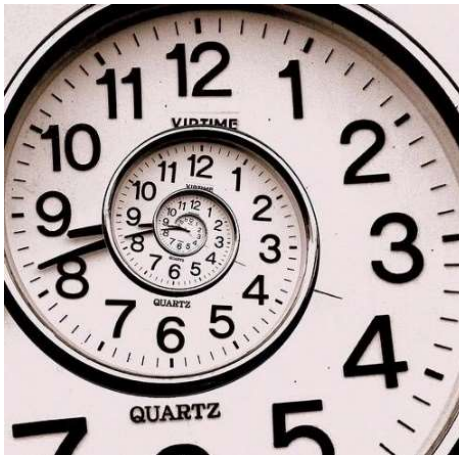
With postgraduate researchers/staff

On real HARD problems

Rolling on year to year each time into a more senior position in the team.

Making them 'ready for graduate employment'

VIP Model



Time for
Students to
Learn,
Contribute, Lead



Long-Term,
Large-Scale,
Ambitious
Projects



Peer-to-Peer
Learning,
Mentoring,
Leadership



Strathclyde VIP journey

2010 Circumstantial visit from Ed Coyle who spoke about VIP



2011 Commitment to implement VIP made at Senate



2012 VIP@Strath launched 6 teams across all four Faculties/Schools

2016 VIP4SD launched as VIP aligned with UN SDGs

2019/20 International Green Gown Award Winner

2022 ESD and Competencies measurement

2023 Hosted first European Hub meeting/ Student workshop

2024 European leads submitted EU funding application



 Green Gown
Awards 2019

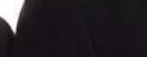
Delivered by
 **eauc**
The Alliance for Sustainability
Leadership in Education



MULTIPLEX



Interface®



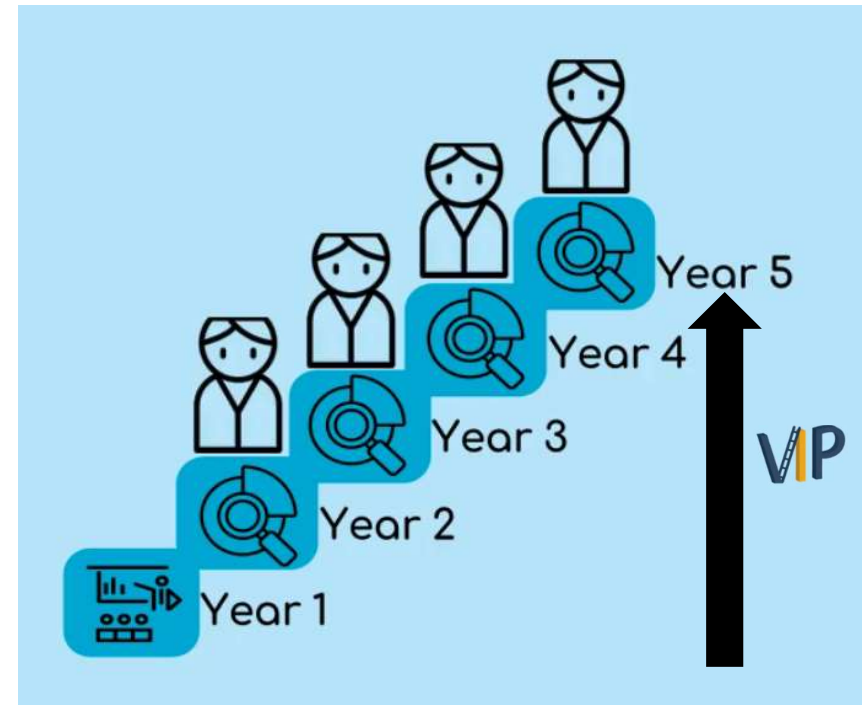
Inter-year (Vertical Integration)



Across Year Groups

- Years 2 and 3 via PBL modules
- Years 4 and 5 via capstone
- Projects long-lasting
- Student become experts

Research-Based Education where curricular focus is on 'learning by doing' or active learning with open inquiry as a key constituent



VIP Consortium – 50+ Institutions, 6 Continents



“As we enjoy great advantages from the inventions of others, we should be glad of an opportunity to serve others by any invention of ours; and this we should do freely and generously.”

Benjamin Franklin

50 Consortium Institutions

Asia

Inha University
National Dong Hwa University
NMIMS University

Europe

Malmö University
Riga Technical University
Rīga Stradiņš University
University of Bath
University of Galway
University of St. Andrews
University of Strathclyde
University West

South America

Universidad de Chile
Universidad del Norte
Universidad ICESI
Universidad Mayor
Universidade Estadual de Campinas

Middle East & North Africa

American University of Beirut
Lebanese American University
The American University in Cairo

United States

Arizona State University
Boise State University
Colorado State University
Coastal Carolina University
Drexel University
Georgia College and State Univ.
Georgia Institute of Technology
Georgia Southern University
Georgia State University
Howard University
Indiana University
Iowa State University
Kennesaw State University
Morehouse College
NYU Tandon School of Engineering

Africa & Pacific

University of New South Wales
University of Pretoria
University of Auckland

NYU Tandon School of Engineering
Purdue University
Rice University
Rochester Institute of Technology
Stony Brook University
Texas A&M University
The Cooper Union
Tougaloo College
University of Arizona
University of California Davis
University of Delaware
University of Georgia
University of Hawaii
Virginia Commonwealth University

Virginia Tech
Virginia Tech Center for Global Projects Program



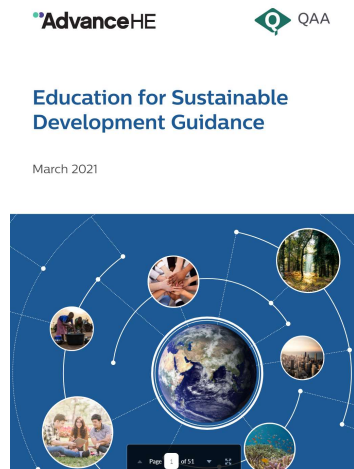


Georgia Tech Consortium meeting

- Annual Meeting and Innovation Competition,
- VIP Site Handbook, Grading and Peer Evals Tools,



The bigger picture - Education **for** Sustainable Development (ESD)



*“Education for sustainable development is the process of equipping students with the **knowledge and understanding, competencies, skills and attributes** needed to work and live in a way that safeguards environmental, social and economic wellbeing, both in the present and for future generations.”*

ESD Definition (UNESCO) – “ESD for 2030”

Interdisciplinary (Horizontal Integration)



Across Depts & Faculties

- Engineering
- HaSS
- Science
- Business School

Research-Based Education where curricular focus is on 'learning by doing' or active learning with open inquiry as a key constituent



Connecting Students to Sustainable Development through Research-Based Education



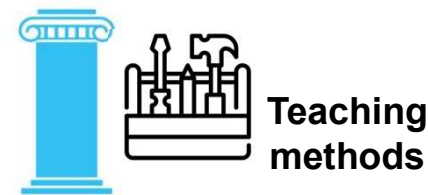
VIP
RBE

=



for
**Sustainable
Development**

RBE where curricular focus is on
'learning by doing' or active learning
with open inquiry as a key constituent



Aligning **RBE** with **Sustainable
Development** challenges



Connecting Students to Sustainable Development through Research-Based Education



Developing **UNESCO ESD competencies** in students

RBE where curricular focus is on 'learning by doing' or active learning with open inquiry as a key constituent

Aligning **RBE** with **Sustainable Development** challenges



Competencies



Teaching methods



SDG Context



for
Sustainable Development

Education for Sustainable Development is about **connecting** the student with the subject matter and/or discipline, not just cognitively, but emotionally and practically too – **head, heart and hands**.



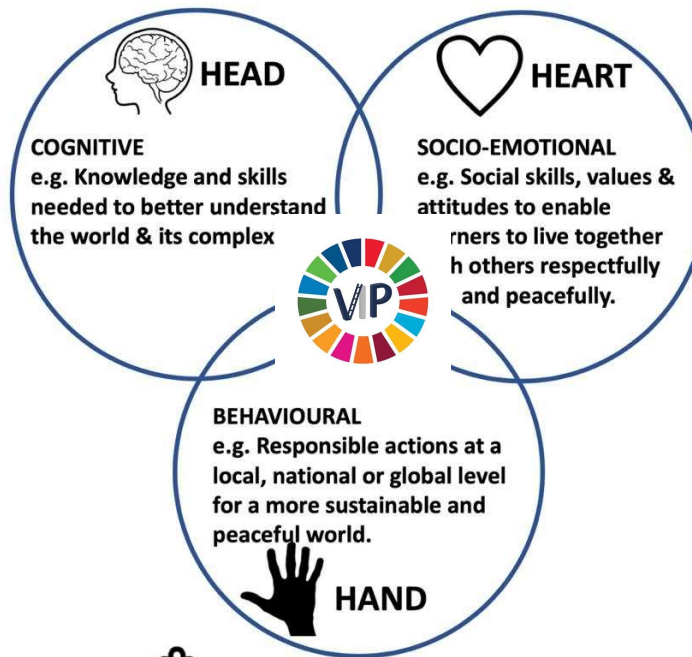
Systems thinking



Critical thinking



Future thinking



Strategic thinking



Collaboration



Integrated Problem-solving



Self-awareness



Normative competency

Competencies

Consideration of what competencies you want your students to exercise/develop





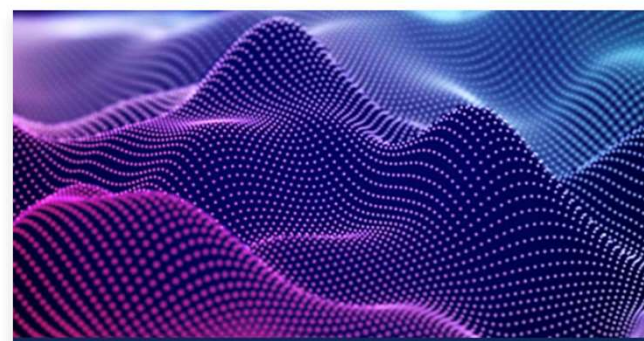
Energy for Development



Inclusive Transitions through Early Years & Beyond



STEM Education and Public Engagement

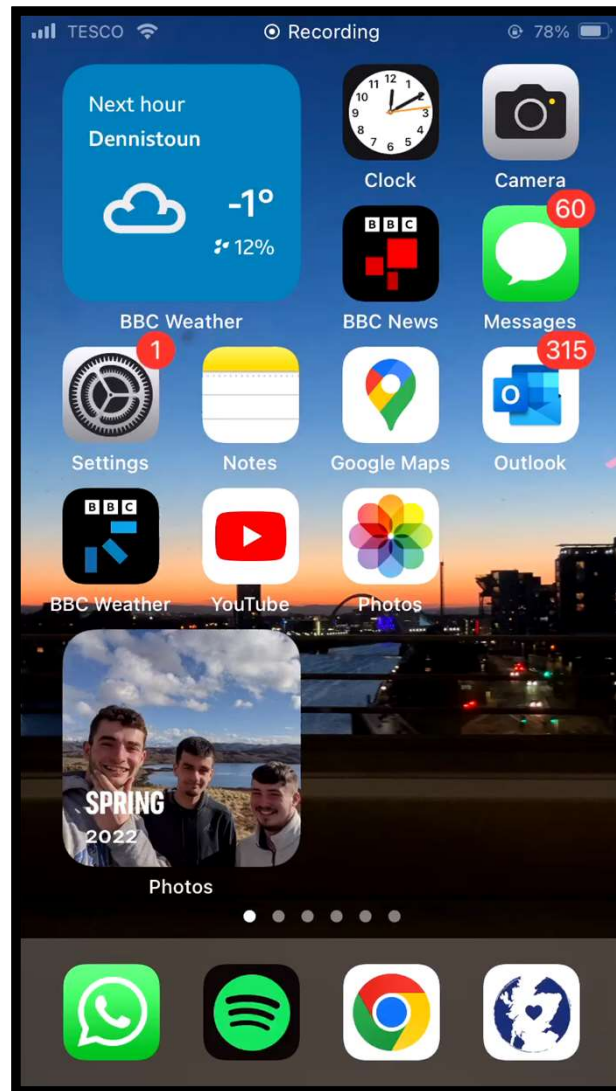


Smart Voice





Apps4Good



The Smart Voice VIP

Recurrent Respiratory Papillomatosis: wart-like growths that occur in the airways.

If untreated, RRP can obstruct airways, and be FATAL!

SYSTEM ARCHITECTURE

.mp3
String response

Local Server
(Django)

Runs:

Python Speech Processing
code

Store .mp3 &
JSON Results

Local folder on Server

APP PROTOTYPE



SIGNAL ANALYSIS

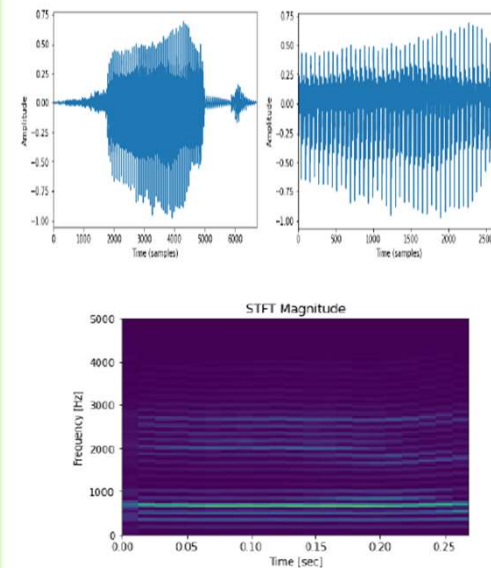
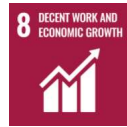


Figure 11: Short Time Fourier Transform

Powering Rural Agriculture

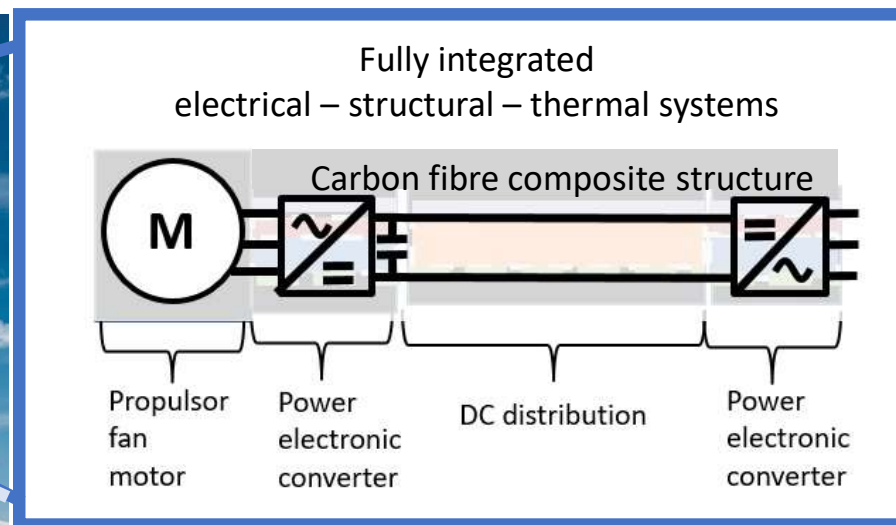


Integrated Systems for Aviation Decarbonisation

- Pre-Covid, 3.8 % of CO₂ emissions come from aviation¹.
- 45% increase in commercial flights in Europe by 2050².
- Pathways to decarbonisation:
 - Combination of technical & economic measures
 - Electrification & light weight structures



This VIP will develop health monitoring and prognostics tools for resilient integrated and multifunctional electrical – structural – thermal next generation



1. "Reducing emissions from aviation", European Commission, 2021, [online], available www.ec.europa.eu/clima/policies/transport/aviation_en.

2. Destination 2050 A new route to net zero European aviation", European Commission, 2021, [online], available https://www.destination2050.eu/wp-content/uploads/2021/02/Destination2050_Report.pdf.

SPACE & SUSTAINABILITY

- ❑ Satellite Data to Assess Impact of Mining Activities on Land and Water Resources
- ❑ Satellite Data for Forestry applications and land use change monitoring
- ❑ Satellite Data for Environmental Impact Assessment of Large Infrastructure Projects



Credits: Bird.i, Airbus, Planet

Evidencing and Articulating Competency Development

- How do we do this effectively?
- Use Moodle platform and scaffolded support to enable students to track their skills development as they progress through their VIP4SD project journey

The screenshot displays the Moodle interface for the 'VIP4SD Course Page'. The top navigation bar includes links for 'class', 'Student Experience', 'Student Voice', and 'Help'. The user 'Scott Strachan' is logged in, with options to 'Turn editing on' and a settings gear. The main content area features a large graphic with the letters 'VIP' in the center, surrounded by 17 colored segments representing the UN Sustainable Development Goals. Various icons (a head with a brain, a head with a question mark, a head with a lightbulb, a person with a checkmark, and a person with a magnifying glass) are arranged around the central graphic. Below the graphic, a quote reads: "VIP4SD is about getting you ready for the world of work, by tackling the work of the world!". A 'Welcome to the Class!' banner is at the bottom of the main content area, followed by a paragraph: 'Welcome to the Myplace page for Vertically Integrated Projects for Sustainable Development. This class will introduce you to the UN's 17 Sustainable Development Goals through a challenge and project-based learning approach. You will work with your fellow student, often from different years of'. The right sidebar contains several sections: 'Completion Progress' (stating 'Completion tracking is not enabled in this course.'), 'MyGroups' (stating 'No groups Found'), 'Notices' (listing three notices from Scott Strachan: 'Attend VIP4SD Workshop this week - W...', 'Attention all VIP4SD students - Ensurey...', and 'VIP4SD - Semester 2 - Important inform...'), 'View Class Notices' (with a 'Post Notice' button), 'Search forums' (with a search bar and 'Advanced search' link), and 'Sustainable Strathclyde Twitter Feed'.

class Student Experience Student Voice Help

es / VIP4SD Course Page

Turn editing on

VIP4SD Course Page

"VIP4SD is about getting you ready for the world of work, by tackling the work of the world!"

Welcome to the Class!

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Completion Progress

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MyGroups

No groups Found

Notices

- Attend VIP4SD Workshop this week - W...
By Scott Strachan | 8 days ago
- Attention all VIP4SD students - Ensurey...
By Scott Strachan | 13 days ago
- VIP4SD - Semester 2 - Important inform...
By Scott Strachan | 22 days ago

View Class Notices

Post Notice

Search forums

Search

Advanced search

Sustainable Strathclyde Twitter Feed

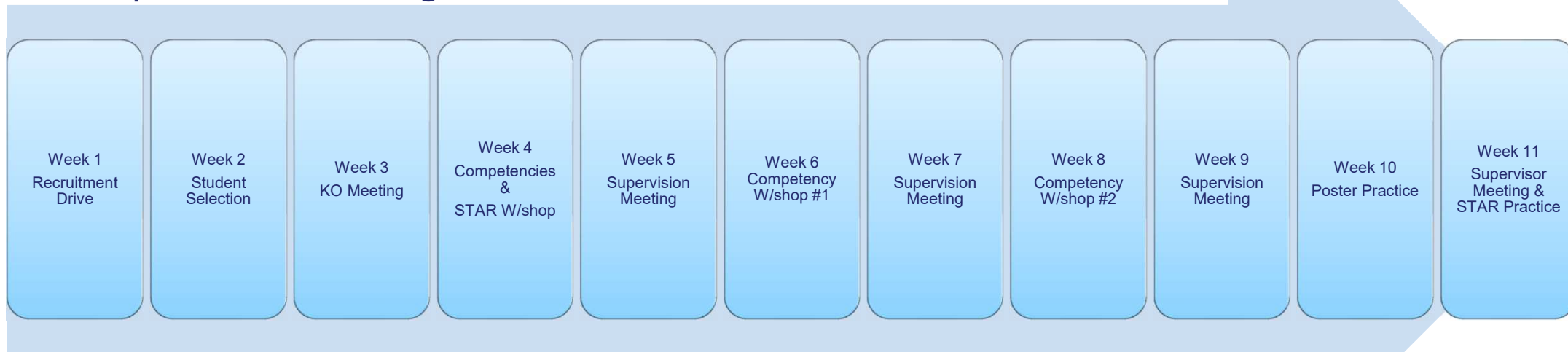
Evidencing and Articulating Competency Development

- How do we do this effectively?
- Use Moodle platform and scaffolded support to enable students to track their skills development as they progress through their VIP4SD project journey
- Frequent reflections and peer feedback
- Scaffolded support in using STAR reflection structure (situation, task, action, reflection) to understand how they are using and developing skills as they go
- Helps students value, track and articulate how, when and where they develop these transdisciplinary competencies through their VIP4SD journey
- Helps us evidence the efficacy of the programme in developing these competencies in students



Semester 1 Structure including:

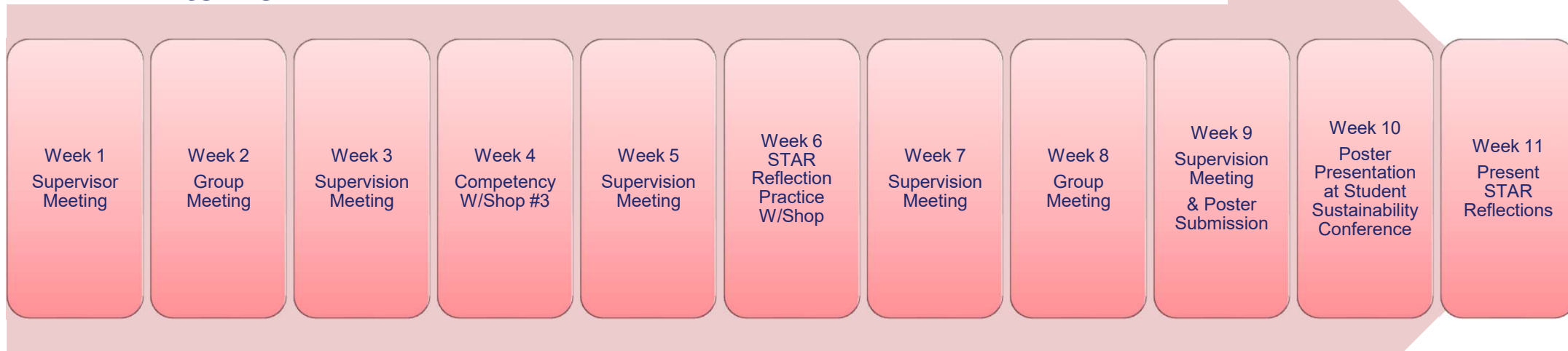
- Student teams must also meet for at least one hour in each week of semester outside of these W/shops and supervisor meetings
- They must upload minutes of group meetings, articulating contributions and actions, and also set agendas for supervisor meetings



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Semester 2 Structure including:

- Week 6 offers further STAR reflection practice
- Week 10 is where teams present their posters for assessment at the Sustainability Conference
- Week 11 is where students present their STAR reflections via short 8 min presentation. Present their articulation of two competencies as part of a mock competency-based interview.



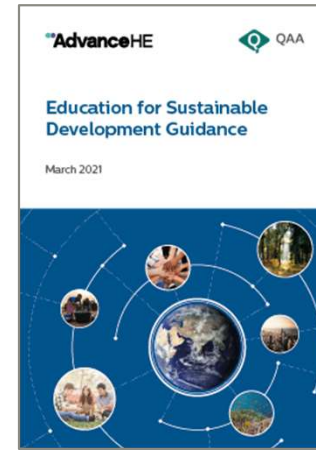
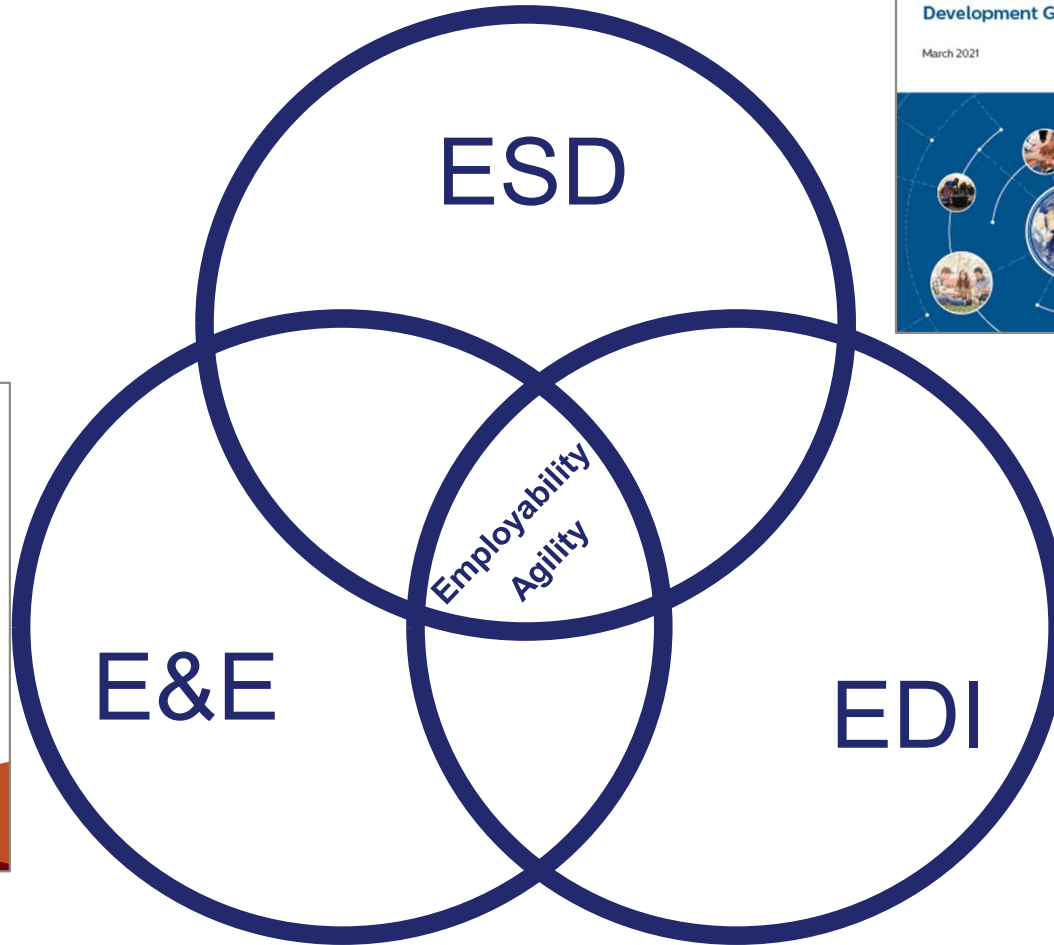
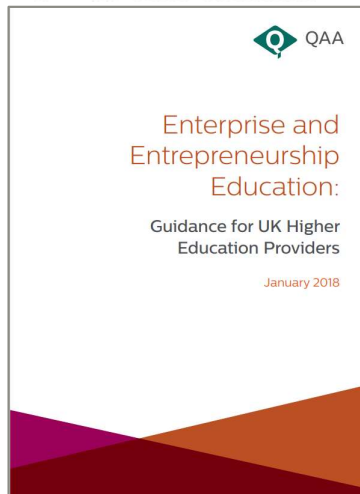
- Also, submit an Executive Summary of their project
- Poster (30%), Competencies Articulation (30%), Exec Summary (30%), Conduct & Engagement (10%)



@ STRATH

ESD Conference





Decolonising the Curriculum Toolkit

This Decolonising the Curriculum Toolkit has been developed in liaison with the Faculty of Science and Engineering Narrowing the Awarding Gaps Task Group, and aims to support academic staff in Science and Engineering in the process of reviewing and decolonising their teaching.

Decolonising the Curriculum (DCC) is about identifying, acknowledging and challenging the ways in which colonialism has impacted upon perceived knowledge and learning. It is not about deleting existing knowledge or history, but about embracing knowledge systems outside of typical western understanding, and which have hitherto been ignored. Decolonising is integral to an inclusive curriculum, and seeks to both recognise and address the legacies of disadvantage, injustice and racism that have arisen from historic global domination by 'The West', and the consequent inherent 'whiteness' of our STEM disciplines.

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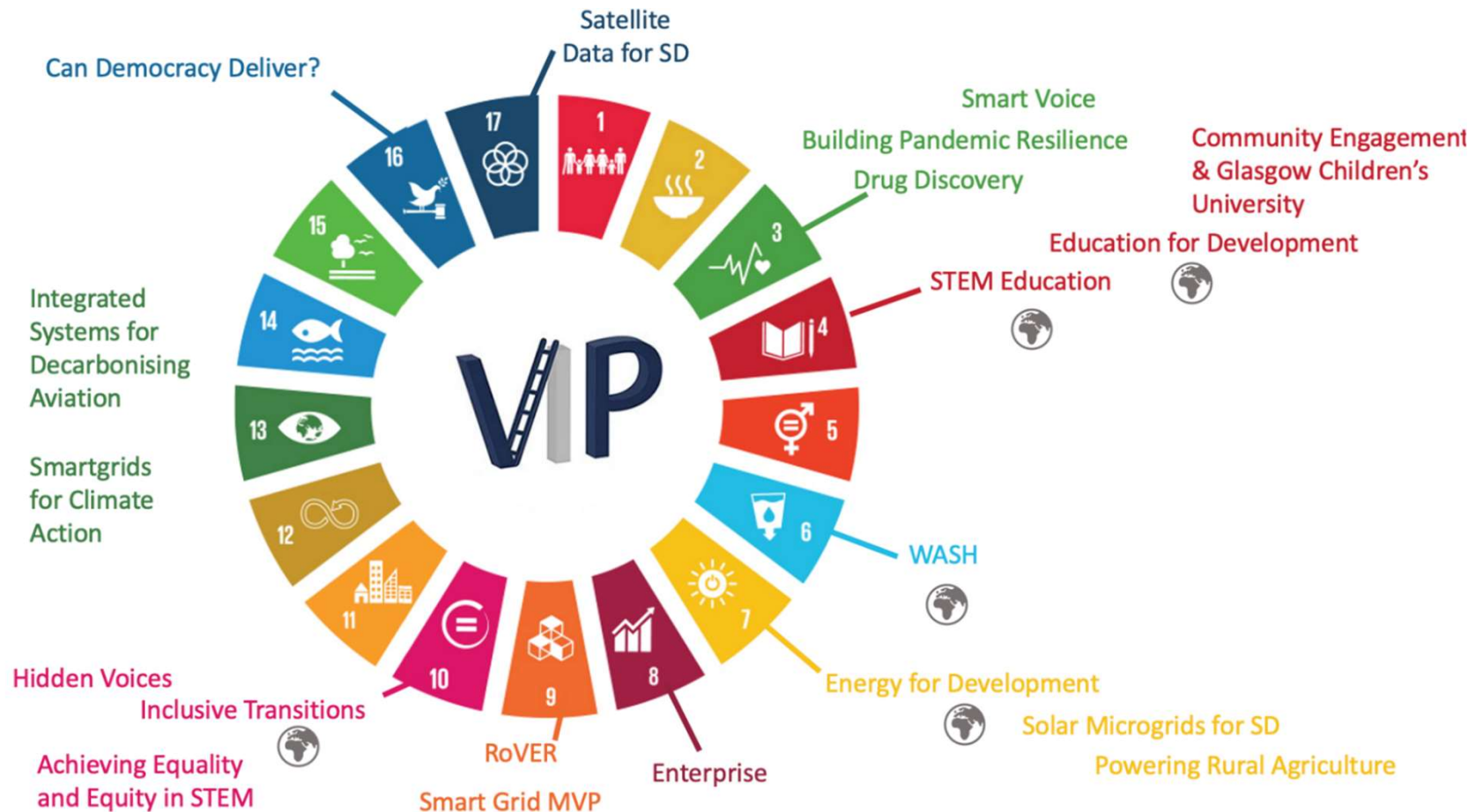


“useful learning”



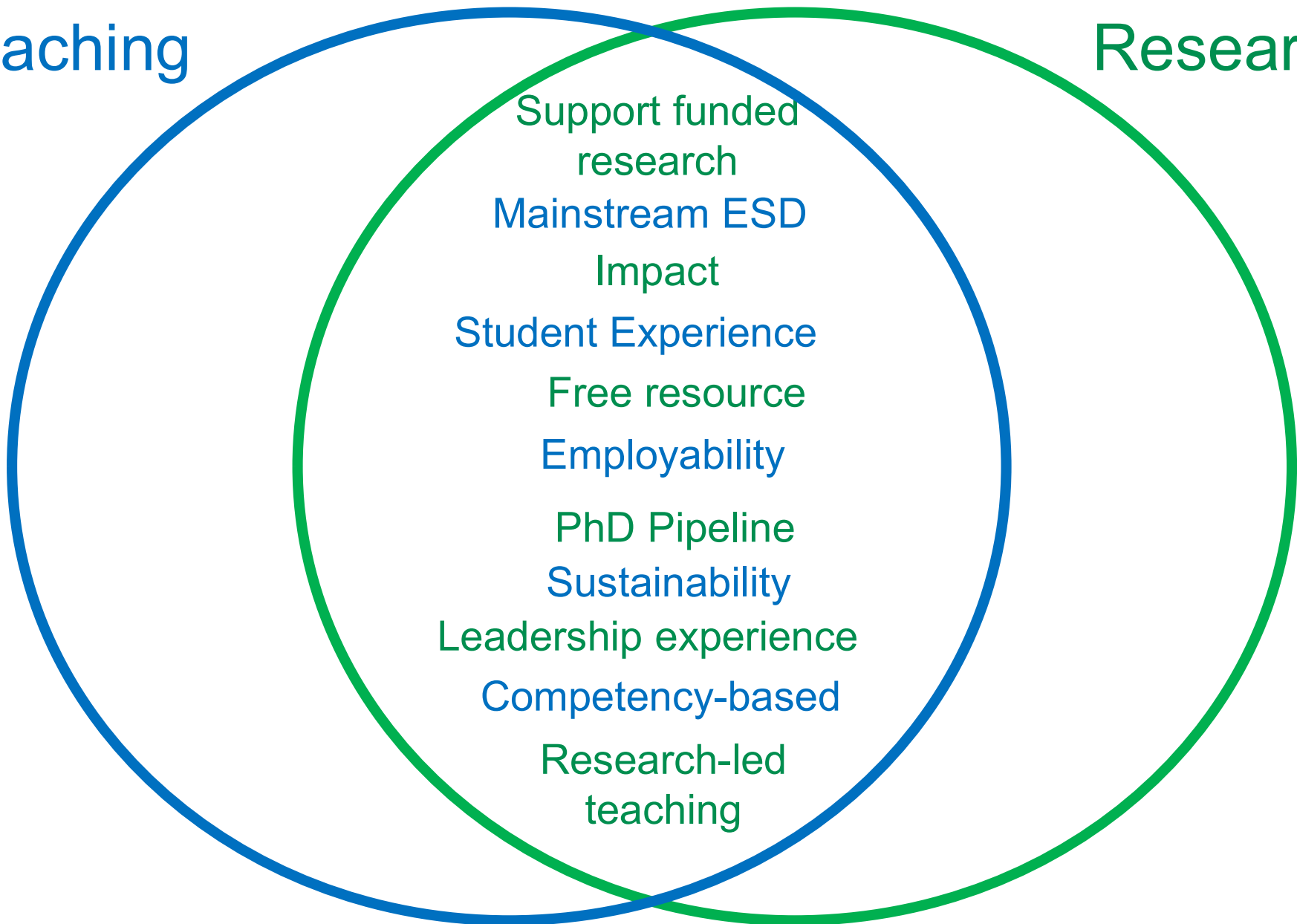
“VIP4SD is about preparing students for *the world of work* by tackling *the work of the world*”

Vertically Integrated Projects for Sustainable Development (VIP4SD)



Teaching

Research



Teaching

Research



More agile students and
more agile research
practice?

“Joining the VIP4SD in my 2nd year was by far one of the best decisions of my university career. It provided me with a fantastic environment to develop both as a student and more widely, as an engineer. The VIP4SD structure allows for an unbounded learning style that is diverse, collaborative, and encourages creativity.”

“The whole experience has really reinforced my reason for coming to university – to help people”.

“The VIP for me has introduced me to the community of sustainable development and helped me to get involved in what I actually want to be doing.”

"The VIP4SD programme offered me something more meaningful than a university class which is being able to work on a real world problem that will genuinely improve the quality of peoples lives. I always wondered, why wait until the end of your degree to do something meaningful?"

“Working in such a multi-disciplinary, multi-level project helped me land my first job with Red Bull Racing, and I still use the skills learnt as I continue my career in Formula 1.”

“I found that through the VIP programme, I was able to engage with the material on a much deeper level”

“The VIP programme has played an integral role in shaping my educational journey at Strathclyde. I believe it has the potential to revolutionise the student experience”



Find out more



Visit our webpage:

[Vertically Integrated Projects for Sustainable Development | University of Strathclyde](#)

[Riga Workshop](#)

View a short video explainer:

[VIP4SD Day Zero – YouTube](#)

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