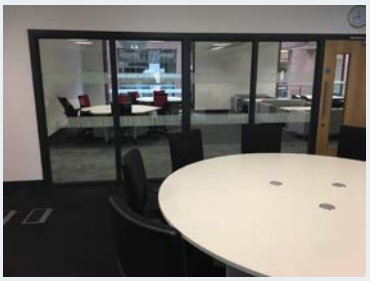
SCALE UP

Student-Centred Active Learning Environment for Upside-Down Pedagogy



The SCALE UP model brings together active learning approaches already being used by many of our staff and creates the right physical environment to make this work well.

What

Key features of the SCALE UP approach

- The use of circular tables accommodating groups;
- Groups of 9 and divisible by 3;
- Technology-rich integrated into small group work;
- Short learning activities interspersed with class-wide discussion;
- Use of the GOAL framework for problem solving (Gather, Organise, Analyse, Learn) or the use of other specific problem-solving frameworks;
- Flipped teaching model;
- Student-led learning;

- Facilitative teaching role;
- Continuous opportunities for in-class formative feedback from peers and tutors;
- Strategic, tutor-allocated group formation e.g. mixed ability groups;
- Use of group roles e.g. manager, scribe, questioner, or other roles;
- Enquiry- or problem-based learning approaches.

There are three essential elements to the SCALE UP approach:

- Room design and equipment, including circular tables, to promote collaboration;
- 'Upside-down' or 'flipped' teaching, whereby content is encountered outside class and sessions are devoted to applying ideas;
- Collaborative learning via problem-solving tasks in strategically assigned groups.

Why

The model exemplifies Chickering & Gamson's 7 Principles for Good practice in Undergraduate Education:

Encourages student-faculty contact

- The academic navigates the room throughout the session working closely with the students through the activities

Encourages co-operation among students

- Student work in groups of 3, 9 and whole class

Encourages active learning

- SCALE UP is based on problem, enquiry and flipped active methods

Gives prompt feedback

- Peers and tutors are engaged
- Active and problem-based approaches generate feedback

Emphasises time on task

- The students engage with pre-class content and are deeply immerse in developing their understanding while together

Communicates high expectations

- The problems are engaging and authentic and active engagement allows each learner to check and deepen their understanding

Respects diverse talents and ways of learning

- The collaborative and authentic nature of the pedagogy encourages inclusive approaches

GOAL framework for problem solving:

Students should use the GOAL framework for problem-solving:

- ***Gather information –*** *look for key phrases, get a "big picture" view of the situation, estimate the final answer, etc.*
- ***Organise your approach*** *– classify the problem and agree on a plan of action.*
- ***Analyse the problem*** *– calculate and note answers.*
- ***Learn from your efforts*** *– reflect on what worked/didn't work and consider how to approach a similar problem next time.*

Establishing groups

The tutor should establish the groups of nine/three

- *Mixed ability groups*
- *Switch group membership every 3-4 weeks*

Deciding on group size for activities

Different activity types will lend themselves to certain configurations such as groups of 3, whole tables, whole class. Allow for individual activities too to ensure students do not become too dependent on each other.

Benefits

Evaluations of SCALE UP at North Carolina State University found several benefits for learning including: enhanced problem solving ability, increased conceptual understanding and higher attendance and satisfaction rates. These were due, in part, to:

- Tutors and peers providing formative feedback in class;
- Increased social interaction among students and tutors.

How

SCALE UP activities usually replace a lecture seminar provision. Lasting two hours, SCALE UP sessions begin by requiring students to engage with pre-class activities to establish an even foundation for deeper learning in class.

> *Set a pre-class activity*

The effective implementation of a SCALE UP approach usually requires a new approach to be devised. A SCALE UP class will use most of the following elements in a combination and order that meets the particular learning context and intended outcomes:

- **Diagnostic activities** - to check comprehension of preparatory work;
- **Establish a substantial problem or investigation** for the session, to be divided into 10-15 minute group activities;
- **Group activities** working in threes and/or nines
    - **application** – students apply their knowledge and are challenged to apply it referring to data and information provided electronically;
    - **generation** – students will make artefacts, lists, notes, measurements, diagrams, etc.;
    - **gather and extend** – respond to questions or problems that may require estimating or looking up values;
    - **simulations** – computer or lab activities.
- **10 minute mini-lecture(s)** to brief activities, confirm and clarify concepts, supplement group work, summarise activities;
- **Group presentations** in plenary, follow up discussion, Q&A;
- **5 minute summary** of the session;
- **Group and individual reflection** on learning and group effectiveness.

Do not be predictable! Use different patterns and activities each week to keep sessions interesting.

Typical activities

- *brainstorming*
- *problem solving*
- *decision-making*
- *role-play*
- *simulations*
- *games*
- *comparing*
- *justifying stances or answers*

Generation of content

Students might make

- *Ordered lists*
- *Assign items to taxonomies*
- *Mini-video presentations*
- *Reflective notes*
- *Twitter responses to class hashtags*
- *Wiki pages or Google Sites*
- *Audio summaries*
- *Mindmaps or concept maps*
- *Poster*
- *Resources for others*

Beichner (2005) thinks of group activities as "tangibles" (short hands-on activities) or "ponderables" (interesting questions to consider)

Five required characteristics of successful group-based instruction

- **Individual accountability** – each member is responsible for doing their share of the work and for mastering the material;
- **Positive interdependence** – team members have to rely on each other;
- **Face-to-face interaction** – some or all of the group effort must involve working together in person;
- **Interpersonal skills** – members learn about and practice leadership, decision-making, communication and conflict management;
- **Regular self-assessment of group functioning** – groups evaluate how well their team is functioning, where they could improve, and what they should do differently in future.

> *Beichner (2005) found that "not incorporating all these aspects is a recipe for failure, at least as far as group functioning is concerned"*

Facilitating group work

Before

- Give explicit instructions verbally and/or in writing; you could ask 'what' and 'how' questions to check task understanding before work begins.

During

- Monitor group progress by circulating among the tables. Address common misconceptions, identify effective approaches and answers, and provide feedback;
- Rather than telling students the right answer, encourage them to help each other. For example, groups who finish a task early can help groups who are struggling;
- Cross-fertilisation of ideas may happen organically as the SCALE UP room is designed to facilitate cross-table discussions and mutual help.

After

- Groups can project to the shared screens or write on the white boards to display their work and obtain feedback in plenary;
- Use follow-up questions to push students' thinking further and to link to the next activity.

Further information

Beichner, R. (2011). Video explaining SCALE UP: https://goo.gl/Rh6zJB

Chickering, A. W. & Gamson, Z. F., Eds. (1987). Seven principles for good practice in undergraduate education. AAHE Bulletin: March: 3-7.

NCSU SCALE UP: http://scaleup.ncsu.edu/

Acknowledgement
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