

Integrating School Based Assessment

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What is School Based Assessment?

Usually termed coursework or project work

- **coursework** *noun* {U} work set at regular periods as part of an educational course
- work assigned to and done by a student during a course of study; usually it is evaluated as part of the student's grade in the course



What differentiates School Based Assessment?

- Usually viewed as formative rather than terminal assessment
- Usually marked by the teacher
- Usually criteria based rather than content based, ie uses indicators of performance



Why encourage SBA?

- SBA can provide good opportunities for formative and open assessment and learning – although it is not the only way

Children who are drilled in number facts algorithms, decoding skills or vocabulary lists without developing a basic conceptual model or seeing the meaning of what they are doing have a very difficult time retaining information (because all the bits are disconnected) and are unable to apply what they have memorised (because it makes no sense).

Shepard '92

A student may be able to get an A in the classroom by memorizing a formula, but if he wants to succeed in business, he has to know why the equation works and when it can be applied.

Gib Bassett – Professor of Finance



Advantages of School Based Assessment

- Formative assessment allows guiding of learning
- Allows focus on learning goals rather than performance goals
- Allows more open assessment and teaching
- Allows integration of assessment with teaching
- Can provide better assessment of higher order skills
- Can provide better assessment of practical or hands-on skills
- Can be fairer to students



Disadvantages of School Based Assessment

- Extra teacher work load
- Extra pressure on teachers (both internal and external)
- Extra pressure on students
- Can be counter-productive
- 'fairness', both perceived and real



How do we integrate SBA with the assessment?

- Depends why we are including SBA
- SBA skills and learning outcomes need to be identified
- Requirements for SBA need to be identified
- Means of assessment needs to ensure good learning **and** assessment of the skills and outcomes
- Scheme of assessment needs to integrate SBA



Separate skills or extended project?

Skills

- Allows teachers to concentrate on individual skills
- Allows staged assessment with continuous feedback
- Allows multiple attempts at each skill
- Allows easier integration with course

Project

- Allows integration of skills
- Allows more open learning
- Project requires careful selection
- Requires a more holistic approach from both teachers and students
- Allows more in-depth study and specialisation

There is a continuum of choice between the extremes



Skills Based Assessment - example

Assessment of four practical Skills (IGCSE Science)

1. Using and organising techniques, apparatus and materials
2. Observing, measuring and recording
3. Handling experimental observations and data
4. Planning investigations



Skill 1 Using and organising techniques, apparatus and materials

- 1
- 2 Follows written, diagrammatic or oral instructions to perform a single practical operation. Uses familiar apparatus and materials adequately, needing reminders on points of safety.
- 3
- 4 Follows written, diagrammatic or oral instructions to perform an experiment involving a series of step-by-step practical operations. Uses familiar apparatus, materials and techniques adequately and safely.
- 5
- 6 Follows written, diagrammatic or oral instructions to perform an experiment involving a series of practical operations where there may be a **need to modify or adjust** one step in the light of the effect of a previous step. Uses familiar apparatus, materials and techniques safely, correctly and methodically.

Mostly measuring performance goals



Skill 4 Planning investigations

1

2 Suggests a simple experimental strategy to investigate a given practical problem.
Attempts trial and error modification in the light of the experimental work carried out.

3

4 Specifies a sequence of activities to investigate a given practical problem.
In a situation where there are two variables, recognises the need to keep one of them constant while the other is being changed.
Comments critically on the original plan, and implements appropriate changes in the light of the experimental work carried out.

5

6 Analyses a practical problem systematically and produces a logical plan for an investigation.
In a given situation, recognises that there are a number of variables, and attempts to control them.
Evaluates chosen procedures, suggests or implements modifications where appropriate and shows a systematic approach in dealing with unexpected results.

Mostly measuring learning goals



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Extended Investigation – example

- AICE Research Project
- School-based in that subject and content are set in the school (by the student with advice from teacher (and Board)) but to ensure fairness marking and feedback done by Cambridge
- Project assessed on criteria in skill areas
 - Knowledge and Understanding
 - Skills and enquiry
 - Evaluation and decision making
- Skills criteria depend on project area
- No pre-defined content or recall



- **Effect of different mycorrhizal fungi on the growth of *Eucalyptus* seedlings**

Cambridge moderator comments:

- ...project well designed (**planning**)
- ...data collected has been chosen well (**organisation**)
- ...report includes clear conclusions, closely related to original aims and wider contexts described in the introduction (**drawing conclusions**)
- ...explanations are convincingly argued (**argumentation**)
- ...a fair attempt at evaluation, with some plausible and well supported arguments to explain some of the more unexpected results (**evaluation**)



High-stakes or low-stakes?

High-stakes

- Contribute to final subject grade
- Moderated
- Externally validated
- Formal

Low-stakes

- Does not contribute to final subject grade
- Can be unmoderated
- Does not need to be externally validated
- Can be informal



Why choose high-stakes?

- Ensures due recognition of skills by teachers, parents and students
- Time spent teaching reflected by contribution to grade
- Motivates students
- Can be fairer

But...

- More administration required
- Needs to ensure equity (moderation)
- Needs to be externally validated
- Can lead to 'teaching to the exam'
- Assessment can get in the way of teaching



Why choose low-stakes?

- Allows freedom
- Ease of administration
- Lower cost
- Less pressure on students/teachers
- No moderation required
- No external verification required
- Can be fairer

But...

- Needs to be separately certificated or subject certificate to be endorsed (may be limited by systems)
- May lead to students/teachers/parents ignoring skills
- May lead to reduction in skills' currency



An example of low-stakes SBA

- For a pre-16 science syllabus aimed at non-academic students
- To encourage teachers to include enough practical work to promote good learning and student enjoyment
- Certificates endorsed pass/fail of minimum learning requirements
- Easy administration for teachers and Board ensures tasks are integrated with lessons and practical work encouraged
- Previously little or no practical work was done as teachers concentrated on the 'exam'



Ensuring fairness and integrity

If teachers are setting and marking students' work to count towards the final subject grade then the same underlying principles of fairness and fitness for purpose used in a Board set and marked component should be applied.

A robust Quality Assurance process must be in place to ensure the teacher assessed mark is a fair and accurate reflection of candidate ability in the skills being assessed

There are usually several stages in this QA process



Teacher Accreditation

- For most high stakes teacher marking, teacher accreditation is required as the first stage in a QA process
- This is to ensure all teachers are competent to assess the students work fairly
- Teachers complete a training course (on-line or face-to-face) or a distance training pack or can apply to be accredited by experience
- Teachers submit sample marking to ensure they understand the marking of the criteria and receive feedback
- Teachers submit sample tasks to ensure they understand the setting of criteria and receive feedback



Internal Moderation

- It is essential that all teachers in a Centre assess coursework to the same standards.
- It is best for all teachers to discuss and be involved in the preparations of worksheets and mark schemes.
- Moderation is easier if teachers use the same worksheets and mark schemes.
- It is helpful if, each time a teacher carries out an assessment, another checks a small sample of the marked work to ensure common standards.



External Moderation / validation

In addition to Internal Moderation, Cambridge must ensure that marking applied in each Centre and across all Centres is correct.

This is usually done by sampling and is referred to as Moderation.



Sampling

Sampling can be:

- All the work that contributes to the final student scores
- Requested sample (the Moderator requests samples of candidates work based on information supplied by the Centre)
- A proportional sample (selected by the accredited teacher responsible for internal moderation)
- A representative sample (the accredited teacher responsible for internal moderation selects three examples of each skill assessed at high, medium and low position in the rank order)
- By visit
- Cambridge always reserves the right to request further examples or the work of any individual candidates and strictly polices sampling



An example of sampling

- Code of Practice Section 4.14.1

All the Coursework that contributed to the final mark for that component will be required for the number of candidates as follows. The accredited teacher responsible for the internal standardisation in the Centre for that syllabus must select candidates covering the whole mark range with marks spaced as evenly as possible from the top mark to the lowest mark. Where there is more than one teacher involved in the marking of the work, the sample must include approximately equal samples of the marking of each teacher.



Sampling regime example

Number of candidates entered	Number of candidates whose work is required
10 or fewer	All
11-50	10
51-100	15
101-200	20
More than 200	10% of the candidates



An example of what the sample must include

For example in IGCSE Science the Centre must send to the Cambridge nominated moderator

- A completed Experiment Form listing and numbering all the tasks used.
- Copies of all worksheets given to students.
- Copies of mark schemes.
- A sample of the candidate's marked written work.
- Completed Individual Candidate Record Cards and Coursework Assessment Summary Forms.



Results of External Moderation

- If candidates' work has been assessed to the correct standard no changes will be made.
- If a Centre has been too generous or too strict, coursework marks for all candidates in that Centre will be adjusted.
- The rank order of candidates from a Centre will not usually be altered.
- Centres will be told whether any changes have been made to their candidates' marks.
- Centres will be given details of why any changes have been made.
- In rare instances, eligibility may be withdrawn or extra teacher training imposed



Other ways of introducing external validity

- Peer review – regional clusters of teachers exchange and review colleagues marking
- Statistical moderation – teachers marks are compared against statistical markers eg theory papers taking into account population distributions
- The reputation and level of respect of teachers within the community is such that this is deemed enough in itself



Other issues

- If SBA is available in parallel with other modes of assessment then procedures need to be in place to ensure that the various routes through a qualification are equitable.
- The scope for malpractice, both with and without the collusion of the teacher, is increased and procedures need to be in place to address these



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However

- In our experience the effective use of rigid Quality Assurance procedures and effective moderation and monitoring means that SBA is no more likely to encourage malpractice than paper based practical tests ...but it does require more policing!



How embedded should SBA be in the curriculum?

Decreasing effectiveness

- Can be completely integrated – for example, in the AICE Research Project the assessment is the curriculum
- **Can be run in parallel with the rest of the course to illustrate and reinforce the concepts and content of the course**
- Can be run as separate units within the time-table
- Can be run separately from the rest of the course

n.b. these issues are not unique to SBA



Week commencing	Monday 11.55-1.05	Wednesday 9.00-10.10	Wednesday 10.30-11.40	Thursday 3.10-4.20
7 th January		10.8 Exercise physiology	10.8 Exercise physiology	10.8 Exercise physiology Homework questions on exercise physiology
14 th January	11.1 intracellular and extracellular enzymes and their applications Check in homework – provide mark scheme	11.1 Production of enzymes commercially - <i>fermenter technology practical set up</i> Minitest on exercise physiology	11.1 Production of enzymes commercially -- application of enzymes, the importance of thermostability	11.1 applications of enzymes: Immobilisation, ease of separation and thermostability, <i>fermenter technology practical completed</i> Homework questions on enzyme production and applications
21 st January	11.1 Enzymes as analytical agents - sensitivity and specificity – glucose measurement – <i>glucose test sticks practical</i> Check in homework – provide mark scheme	Mock examination – Unit 1 Hand back first coursework	<i>Coursework Planning – immobilised enzymes investigation</i>	<i>Coursework Planning – immobilised enzymes investigation</i> Homework – complete plan
28 th January	<i>Coursework practical work – immobilised enzymes investigation</i> Check in homework – before practical work can begin	<i>Coursework practical work – immobilised enzymes investigation</i>	<i>Coursework practical work – immobilised enzymes investigation</i>	<i>Coursework analysis and write up briefing – immobilised enzymes investigation</i> Homework – work on write up
4 th February	11.2 Mitosis and the cell cycle Check in homework – progress on write up	11.2 <i>Staining chromosomes practical garlic, acetic orcein – microscopes and prepared slides</i>	11.2 meiosis 11.3 DNA structure Minitest on cell division	<i>11.3 DNA replication practical isolating DNA from onion cells</i> Hand in completed write up – YES, that's right – DRAFT 1 COURSEWORK DEADLINE Homework DNA structure and replication questions
11 th February	11.3 Evidence that DNA is the genetic material - problem solving Check in homework – provide mark scheme	11.3 Genetic code	11.3 Mechanism of protein synthesis Minitest on DNA structure and replication	11.3 Protein synthesis – reinforcement, impact on phenotype Homework protein synthesis questions



How it works in practice

- An example from IGCSE Science Coursework illustrating what guidance we give to our teachers



Practical assessment sessions

- Assessments should fit into the normal teaching programme.
- Easier assessments may be carried out earlier in the course and more difficult ones towards the end, but all are marked to the same standard.
- Students may be given feedback.
- It is best for students to work alone rather than in groups.
- Strict examination conditions are not necessary, but students must work quietly and individually.



Procedure

- Choose tasks to assess the four Skills
- Produce worksheets and mark schemes
- Assess each student at least twice on each of the four Skills
- Use the best two marks for each Skill to determine the overall mark for each student
- Assemble a coursework sample to be sent to the External Moderator
- Receive feedback from the External Moderator



Tasks

- There must be a practical context for each task. No paper and pencil exercises.
- It is not essential for all students to be assessed on the same tasks, but it makes differentiation and internal moderation easier
- Exemplar tasks are provided and existing practical exercises can be modified.
- One or more Skills can be assessed on the same task, but not Skills 1 and 4 on the same task.
- A minimum of 8 tasks will be needed if one Skill is assessed per task. It is better to do more tasks and choose the best. Most teachers use between 8 and 12 tasks.



Worksheets and mark schemes

- Teachers do not have to use worksheets, but they do help.
- For Skills 1,2 and 3 teachers need to give clear and unambiguous instructions.
- Worksheets can be differentiated for different abilities or at different stages during the course (extension tasks for high-performing students are a good idea)
- Mark schemes must match the Skill criteria.
- Performance criteria or tick list mark schemes may be used.
- Each mark scheme should be restricted to one Skill.



Awarding of marks

- Each Skill must be assessed on at least two occasions for each student.
- Each Skill has a maximum mark of 6, giving a total mark for all 4 Skills out of 48.
- Skill criteria are hierarchical on a 6 point scale.
- Criteria are given for 2, 4 and 6 marks.
- Performance below or between these criteria are awarded 0, 1, 3 or 5.
- Students may be given a copy of the criteria for each Skill.



Marks and sample submitted to Board

- Marks are submitted and loaded against entries
- Sample is moderated and scaling applied
- Component and syllabus grades calculated
- Feedback and coursework samples returned to Centre

