Item Banking across borders

Purpose and scope

This paper summarises a white paper presentation by David Haggie of GradeMaker Ltd (a Stephen Austin group operating company) to the Chief Executives of SAAEA at a meeting in Victoria Falls, Zimbabwe on 18th March 2014.

The presentation brief was to explore possible collaboration opportunities across the SAAEA membership, rather than present recommendations.

The author acknowledges the many helpful ideas and suggestions of SAAEA members in providing stimulus and direction to the paper. However any errors, misunderstandings or inconsistencies that remain in the paper are solely the fault of the author.

About GradeMaker

GradeMaker is an Item Banking system, developed by GradeMaker ltd, an operating company of the Stephen Austin group. Stephen Austin has been providing secure printing services to the examination sector for over 60 years.

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Executive summary

Examination bodies are central players in any educational system, responsible for the creation of test instruments which determine outcomes for students, and drive the stream of data which is central to accountability and school improvement. Student progression to work and higher education, school performance, labour mobility, and in many ways the learning experience itself are all determined by the quality and purpose of assessment.

Creating test instruments which are valid and reliable and which promote rather than discourage good teaching practice is a technically complex, highly skilled task.   It often involves teams of up to 500 people including Setters, Subject Officers, and variously named Moderators, Research leads and Committees all working together to produce secure, meaningful assessments.

In common with most assessment processes (candidate registration, marking, printing, security tracking, results analysis), item and paper authoring is undergoing a transformation through technology, loosely named as 'Item Banking'.

This paper argues that the advent of Item Banking, often introduced to support the work of an individual examination council, offers significant wider potential in the field of cross border exam council collaboration. Such collaboration is actively encouraged by SAAEA, working in line with protocols agreed by SADC and has potentially significant benefits at national and regional level.

The paper explains what Item Banking is and defines item banking in an international context in order to established common scope.

It analyses the potential benefits under three scenario driven headings, each scenario shaped by the extent of the collaboration:
- sharing at 'archive' level (whereby only exposed, historic exam materials and data is shared, excluding any syllabus alignment and live test content)
- sharing at 'syllabus' level (whereby portions of syllabuses are aligned, for example core parts of core subjects). Note the scenario does not consider complete syllabus alignment as this is not widely viewed as practical or desirable.
- sharing at 'live item' level (whereby unused live items are shared, either through a pool or by including common items in examinations across a region).

The benefits proposed are summarised as follows:

Archive level:
- Supports the item production work of subject officers and increases the pool of usable examination material in every participating state.
- Creates an opportunity to re-use artwork to save time and money.
- Makes cross border equating easier.

Syllabus level:

- Easier to find and re-use items .
- Practical to run shared QA processes.
- Significant stimulus to publishers (a 'single market' supporting deeper investment in materials).

Live item level:
- Potential for rapid large scale item bank development (reducing risk and ultimately supporting practice testing).
- Potential to benchmark across borders.

Note that while this paper discusses item banking across borders, it is very possible to implement item banking **without** any international collaboration at all, if required.

What is item banking?

In this paper the term Item Banking is used to mean a database driven technology which stores and manipulates the following:

- Archived examination content, including Syllabus documents, Exam Papers, Mark Scheme documents, Examiner reports, Exam items and related content, images and artwork all relating to past, exposed examination papers.
- Live examination content relating to draft items, approved items and live papers (papers not yet sat) and related documentation.
- Data and comments relating to examination items, artwork and papers.

As well as storing these materials and data, the item bank supports the authoring process through the following generic stages:
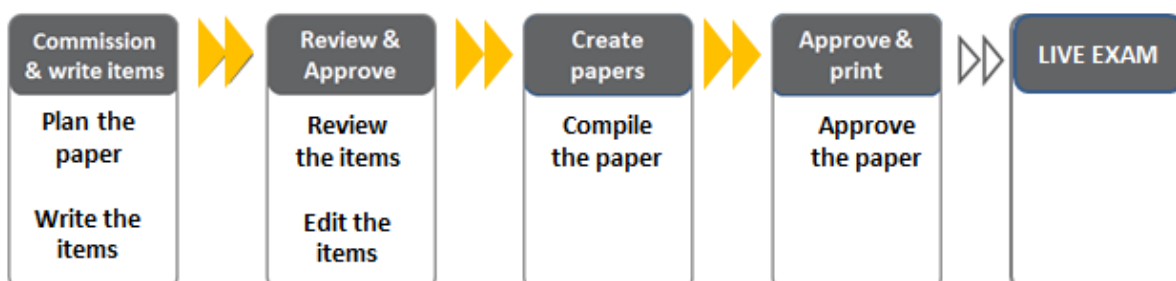
The objectives of the bank are to support the authoring process itself, and to inform the professional judgments made by all actors involved in the process with the aim of delivering continuous improvement in the quality of exam items and tests.

Item banking across borders

In this paper, international item banking is analysed in a context in which individual national bodies are not in competition, and each has its own item banking system comprising databases and tools. Collaborative international item banking can be visualised in the following way:
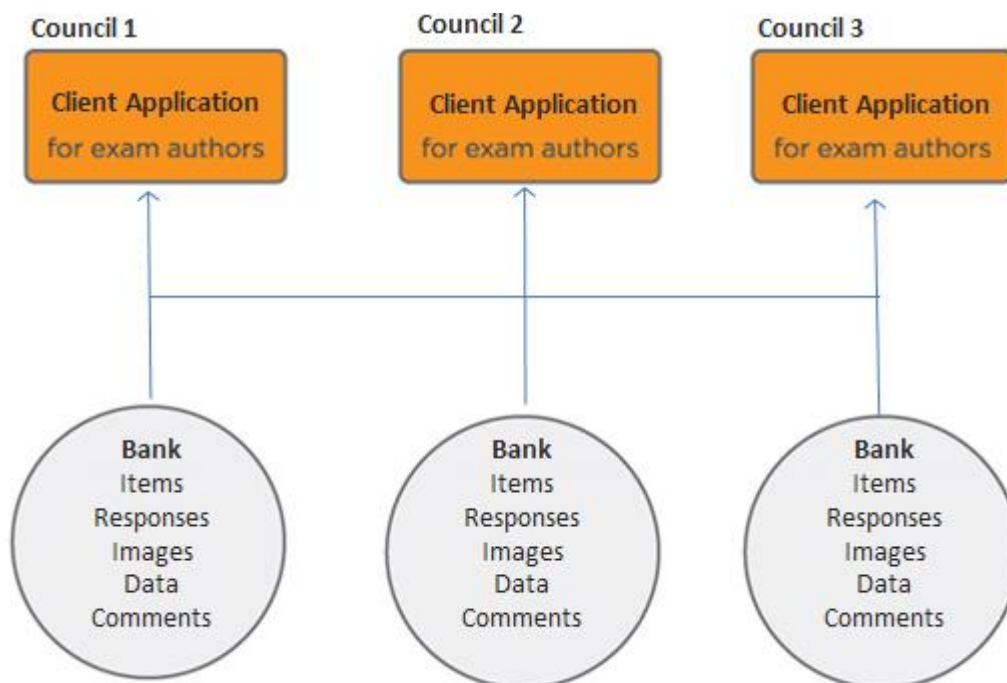
In this illustration, each Examination Council can access both its own content and data, but also the content and data of its partners.

The potential impact item banking across borders is set out below under 3 scenarios.

- In Scenario 1 shared access is limited to previously exposed exam items and any data that might be available which relates to them. Live items are excluded.
- In Scenario 2 search is made easier because portions of the syllabus in some subjects are shared, so there is no need to understand several different taxonomies to find material relating to a particular topic.
- In Scenario 3, the range of shared content increases to include some live items (probably limited to parts of particular subjects).

Scenario 1: sharing the archive

What is shared?

In this scenario, only approved elements of the archive of examination material are shared, for example past papers and items and any related performance data.   Live examination materials are excluded. Where the Examination Council chooses to 'suppress' an archived item and so prevent neighbours accessing it (for example because it does not own the rights to re-use artwork, or because it performed badly) it can do so.

- Live exam materials are not shared across borders. Live blueprints, items which have not yet been used in examinations, 'live' papers etc. all remain accessible solely within national Examination Councils.

- No syllabus alignment or harmonisation. Each participating Council continues to operate its own independent curriculum and examination syllabus.

How can the materials be accessed?

Any approved user can access the open archives of neighbouring Examination Councils and carry out a search using any combination of the following criteria:

- Syllabus (topic, assessment objective; other competences), 'word' (any free text word in a question); question type (e.g. short response, multiple choice etc.); year; Blooms taxonomy; facility score; discrimination score. Note that because syllabuses are not aligned, a syllabus-led search would require to user to view the syllabus model of each State to find resources. Free text search, Blooms, facility and discrimination would operate without this constraint (single search hits all databases).

- Artwork can also be searched by all of the criteria set out above plus 'artwork type' (e.g. 'drawing', 'map', 'photograph' etc.).

Potential benefits

- Supports the **item production** work of subject officers. Officers charged with commissioning and developing new items can search the archives of neighbouring Councils and find examples which might be copied or adapted for local use, or used as references to inform local authoring teams. Because these items have already been exposed, they are likely to come with item performance data (which can be accessed in the item bank). This approach has significant potential time, quality and cost benefits.

- Opportunity to make **cross border equating** and analysis easier (because items with their performance data are available in digital format with advanced search). For example a researcher could view all items from all participating States on a particular topic at the end of Primary and compare assessment approaches, questioning styles, item performance and difficulty in order to inform review of assessment grade transferability. It would be possible (subject to source data availability) to build data extracts by level/country/topic, for example, in order to inform analysis of comparability of different assessment systems at a detailed level.   This makes it easier to move towards qualification portability across borders.

- Opportunity to **re-use artwork** to save time and money. Because artwork is held in its native digital form in the best available quality with rights information, it would be possible for subject officers to re-use artwork where appropriate either directly as an asset in a new item, or (where changes are required) as a rapid way or creating a better quality artwork brief.

Scenario 2: syllabus alignment

What is shared?

- In this scenario sharing is limited to the archive, non-secure content outlined in scenario 1. However some syllabus alignment is envisaged (so for example sections of syllabuses like maths, sciences are brought into line across the collaborating States). Note that this alignment might apply to parts of the syllabus and only to some subjects (thus protecting culturally specific curriculum areas which must remain diverse).   For example there might be alignment in the topics and sub-topics taught in Maths/Fractions, or Physics/Energy but languages, literature, history, geography may retain diversity.
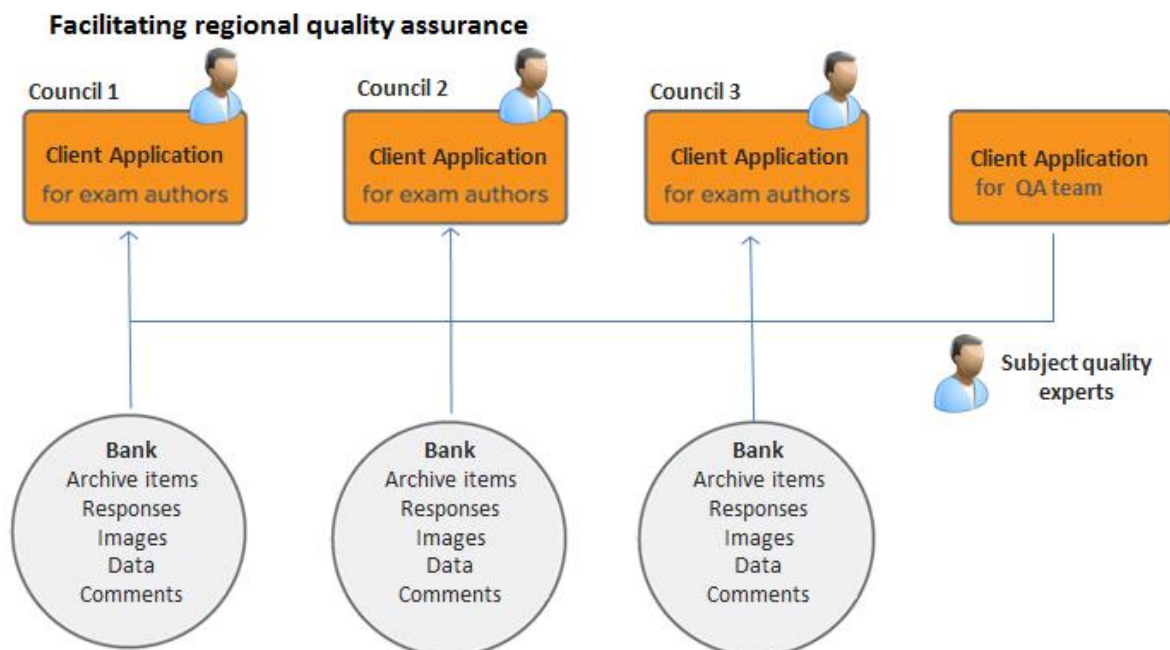
How can the materials be accessed?

- Search of materials would be as per scenario 1, except that search is simplified in areas where syllabuses are aligned (because all users share the same data model for that part of the curriculum.

Potential Benefits

- The opportunity for **item re-use or adaptation** expands, making it easier for Subject Officers to build banks of proven items for use in tests. This reduces costs and risk, and increases examination quality.

- It becomes easier to run **shared quality assurance processes** and to collaborate more closely: if subject teams are all working on the same Assessment Objectives, Topics etc. it becomes easier to build a dispersed subject expert network and to run collaborative procedures such as syllabus quality review, paper review, shared investment in innovation.

Facilitating regional quality assurance

Council 1	Council 2	Council 3	
Client Application for exam authors	Client Application for exam authors	Client Application for exam authors	Client Application for QA team

Subject quality experts

Bank Archive items Responses Images Data Comments	Bank Archive items Responses Images Data Comments	Bank Archive items Responses Images Data Comments

In this illustration, three Councils have developed deep expertise in particular subject areas (e.g. Maths assessment in Council 1) and share this via an item bank with partner Councils. A third party specialist assessment agency is also providing services. By pooling demand individual bodies can create stronger centres of excellence than would be possible if they worked alone. Note: collaboration of this sort is possible without any syllabus alignment; syllabus alignment (even at a partial level) makes it easier.

- Syllabus sharing also makes it easier for **publishers** to invest in educational content for the SADC region, creating a 'single market' which supports deeper investment in materials. The diversity of the current national syllabuses creates a barrier to publisher investment. Even partial alignment in core areas of STEM subjects, for example, will stimulate publisher investment leading to improved support materials for schools.

Scenario 3: Live item level collaboration

What is shared?

- In this scenario secure, live items are shared alongside archive materials. Such items only relate to shared syllabus areas. These items might be created by a single team of authors (in one location or collaborating cross border via the technology), or by several teams. Sharing would be limited to named individuals.

How can the materials be accessed?

- The materials can be accessed online by named individuals only via a search which includes a search against syllabus as described in scenario 2.

Potential Benefits

- This scenario creates the opportunity for rapid **large scale item bank** development (reducing risk and ultimately supporting practice testing). For example a single pool of live maths items might be created from which individual States could select items for their national tests.
- This scenario creates the potential to **benchmark** across borders. In this approach, a limited pool of anchor items are created for use by all participating States in their examinations, thus providing a data set to support comparison of standards across borders. This data set would strengthen the qualitative cross border equating referred to in scenario 1.

Conclusion

Technology enabled collaboration between non-competing Examination Councils across a region (such as the SADC area) has clear potential to deliver significant benefits.

Foremost amongst these are the:
- provision of access to a larger pool of tested, data rich exemplar assessment content, making the work of subject officers easier and raise the quality of tests.
- provision of support for the process of equating across borders, which is essential to support SADC goals of student and labour mobility.
- lowering of the barriers to full or partial syllabus alignment, which creates incentives for publishers to invest more in support materials for schools.
- establishment of a mechanism to build and share regional expertise in assessment and quality processes, significantly supporting the work of capacity building and localisation.

Moving from simple archive access to syllabus alignment and QA across borders clearly involves a rising level of programme complexity. But because archive sharing has such a significant impact, the relationship between complexity and benefits is not likely to be linear. Instead the following pattern is expected to apply:
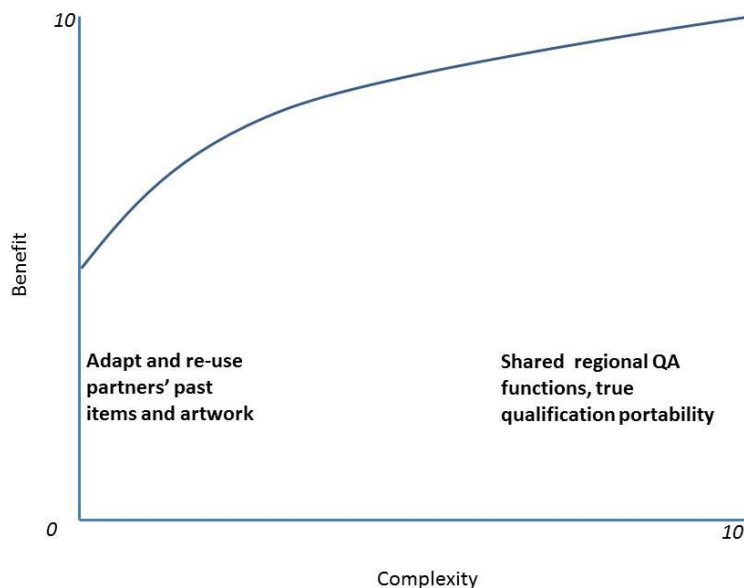
The potential of technology to facilitate regional goals, therefore, is clear. The challenge will be to work out the most effective way to realise its benefits.