**<u>Engaging students through Social Media - Empowering Assessment Analytics</u>**

**Proposing Organisation:**
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<u>**Abstract:**</u>

Social Media as part of the learning process has many benefits - it provides an engaging and highly collaborative learning environment to develop 21st century learning skills. However, it also creates challenges for teachers, who to understand the value of the learning taking place, need to trawl through lengthy threads of interaction to identify the parts that illustrate understanding, demonstrate key skills and link to the learning objectives for the task in hand.

Working with the Infocomm Development Agency of Singapore  and local schools, a range of innovative analytic tools have been piloted that enable teachers to quickly assess student social media interactions in two ways:

1) Quantitative Analysis - quantifying the amount, frequency and participation of the learners through a highly intuitive graphical interface; and

2) Qualitative Analysis - using Latent Semantic Indexing and measures of centrality to identifying the quality of the student interactions and relate these to the learning objectives set by the teacher.

The presentation to accompany this paper will provide insight into the work undertaken as part of this highly innovative project, including lessons learnt and areas for further development. It will also present an opportunity for institutions and organisations to become involved in the project as it continues.

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**Engaging students through Social Media - Empowering Assessment Analytics**

There is no doubt that the use of Social Media as part of the learning process has many benefits - it is highly engaging, providing a familiar and highly collaborative learning environment that encourages the development of 21st century learning skills. However, it also creates challenges, especially for busy teachers, who to understand the value of the learning taking place through this medium, need to trawl through lengthy threads of interaction to identify the nuggets of discussion that illustrate understanding, demonstrate key skills and link to the learning objectives for the task in hand.

Working as part of a joint-funded partnership with the Infocomm Development Agency of Singapore, part of the Ministry of Education, and local schools in Singapore, TAG has developed a range of analytic tools designed to work seamlessly as part of an institution's LMS/VLE that enable teachers to quickly analyse student interactions via Social Media (including Facebook and Twitter) as part of formal and informal learning.

The teacher analytic tools created for this project analyse the student interactions in two key ways:

1) Quantitative Analysis - quantifying the amount, frequency and participation of the learners in the discussion, with this data displayed to the teacher through a highly intuitive graphical interface; and

2) Qualitative Analysis - automatically identifying the quality of the student interactions and relating these to the learning objectives set by the teacher for the task being undertaken.

This second form of analysis is where the most significant technological innovation has taken place. Using a range of approaches, including Latent Semantic Indexing and measures of centrality, we have been able to develop an AI engine that can be trained to mark and interpret student work like a teacher. However, the aim here is not to replace the teacher, but to make intelligent suggestions of where students are meeting learning objectives for the teacher to then validate - thus reducing the amount of manual trawling the teacher has to do to identify the key outcomes of student interaction.

This paper aims to provide an insight into the work undertaken as part of this highly innovative project. The following section provides an overview of the system developed by TAG and a local Singapore based development company to support the project.

**Solution Overview:**
The solution utilises an enhanced version of TAG's existing evidence-based assessment solution MAPS (Managed Assessment Portfolio System) to provide a mechanism for supporting the capture and evidencing of student comprehension and collaboration through the use of social media based tools. Whilst MAPS was used for the initial stages of the project, the solution has been specifically designed so that the resulting analytic tools can be plugged into any web-based Virtual Learning Environment/Assessment platform

*Assessment Task Creation/Authoring:*
The teacher is able to define a timeline for the task, with a number of steps or stages within the task with each step displayed as a box on the overall task timeline:
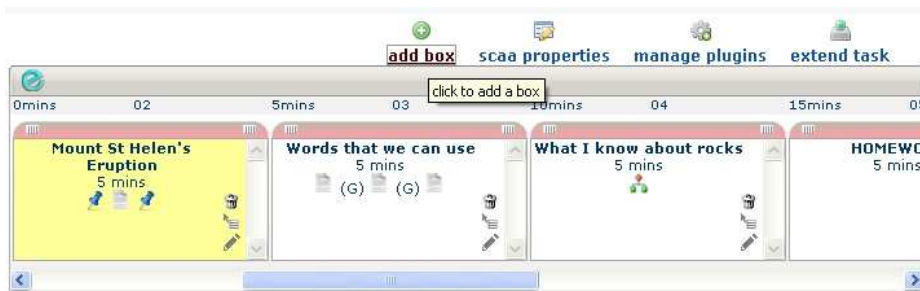
The teacher can define the content (text, images, links to internal/external resources) for each stage of the task and also provide the students with access to a number of in-built evidence capture tools including text, drawing, photo, video, audio, mind map and micro-blog.
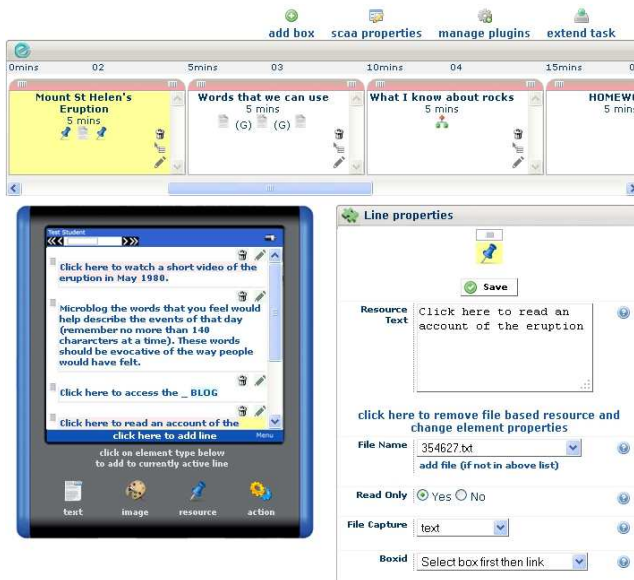


*Defining skills, key words, phrases and semantic meaning:*
The teacher can then define their own marking rubric for the task, i.e. the words, phrases, meanings or skills that they are looking for the students to demonstrate through their work in the task. The criteria within the rubric can be arranged in marking 'blocks' with a grade, mark, or range of marks attached to each block/criteria. The criteria can be completely bespoke or imported from existing lists. Rubrics can also be defined as being able to be self-assessed by the student if required.

*Assigning tasks/activities to the students:*
Teachers have complete control over the process of assigning work to students, either individually or in groups. They can also define the start and end date for the task, which can be differentiated by individual student.
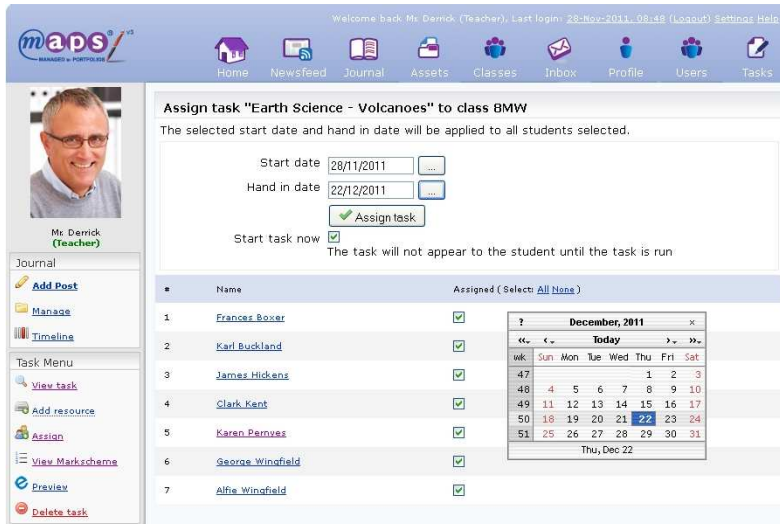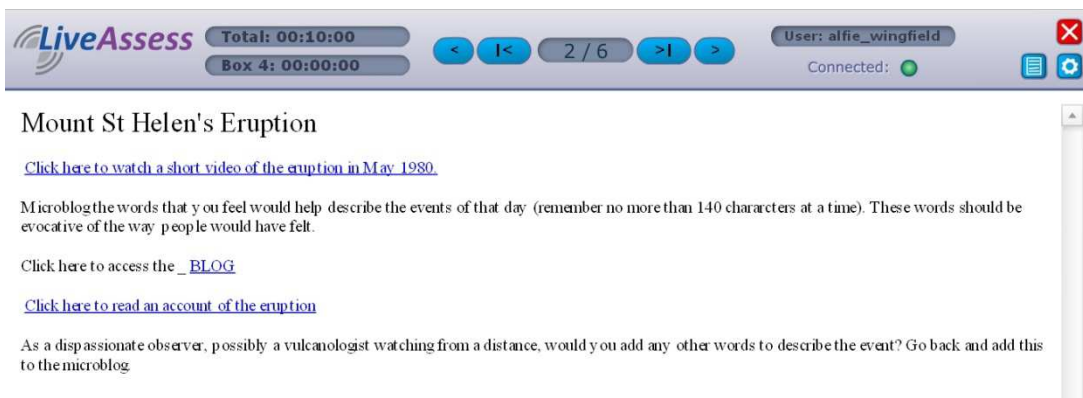
*Student view of task:*

Students access the task that the teacher has created and assigned through a browser:



They progress through the stages of the task by clicking on the navigation arrows at the top of each screen and are presented with the instructions and content that the teacher has defined for each stage:



The student can then use the evidence capture and collaboration tools that the teacher has given them access to through the software, to capture and share their thoughts on the task through text, drawings, photos, videos, audio recordings, bubble maps (mind maps):
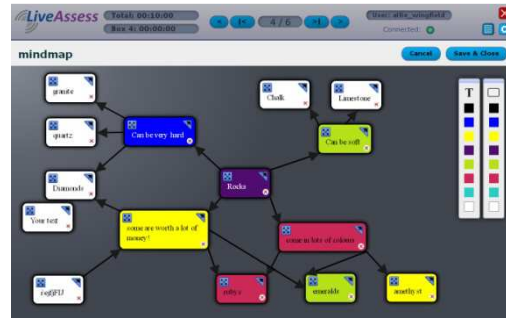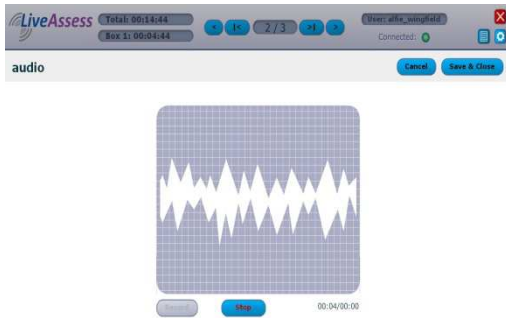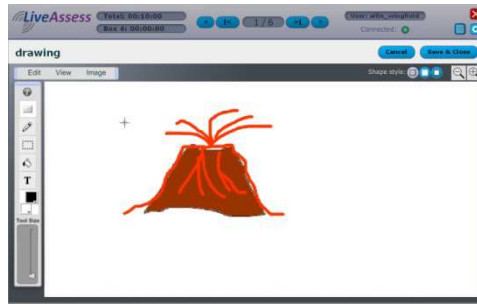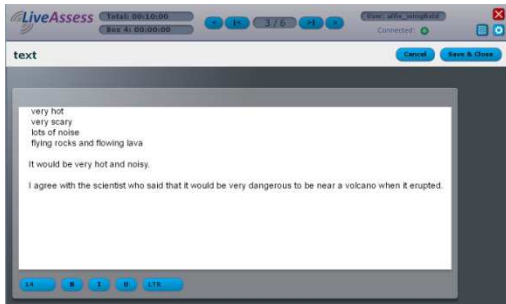
*Student Collaboration – through social media tools:*
Students can collaborate with each other through the use of social media text tools, either using their own existing accounts for Facebook or Twitter, which plug-in to the MAPS system, or else via MAPS in-built micro-blogging tool:



*Student Collaboration – through shared portfolios:*
Students can also collaborate through the use of group portfolios, where students are able to view and comment on each other's contributions to parts of the portfolio that the teacher has enabled to be shared across the group:

Words that we can use

In your group (your teacher will tell you which group you are in) put up your list of words. ___Access group portfolio text here

Read your partners piece by looking at the group portfolio and choosing it. Write a critique of your partners piece. Is there anything that you agree with or they have missed out? Put your partners name at the top. ___Access group portfolio text here for the critique.

Using your revised list of words put up your final list of words on the microblog.

Group view (A) ⊕

Alfie Wingfield Clark Kent Karen Pernyes Karl Buckland James Hickens Frances Boxer George Wingfield

3 of 6 :: Words that we can use

Alfie Wingfield

very hot very scary
lots of noise flying
rocks and flowing lava
..(61 more words)

Karen Pernyes

hot lava scary

*Student progression – storyboard portfolios:*
As the student completes the different stages of each task, the work that the students have created is automatically captured and displayed in a storyboard portfolio, which shows a holistic view of the students work and progression through the different stages of the task:

1 of 6 :: Introduction to MAPS

2 of 6 :: Mount St Helen's Eruptio..
show
microblog

3 of 6 :: Words that we can use
very hot very scary lots of noise flying rocks and flowing lava ..(61 more words)
show
microblog

4 of 6 :: What I know about rocks
click to view
mindmap file

5 of 6 :: HOMEWORK

6 of 6 :: Survey

*Teacher managing/monitoring the task:*
The teacher is given access to a browser based dashboard through which they can monitor student progression through the task, see how much of each stage the student has completed, control which stage of the task the student works on next (if desirable) and access the students' portfolios:

maps

Welcome back Mr. Derrick (Teacher), Last login: 20-Nov-2011, 23:11 (Logout) Settings Help

Home  Newsfeed  Journal  Assets  Classes  Inbox  Profile  Users  Tasks

Next refresh in 1 seconds - force refresh

**Earth Science - Volcanoes - in progress**

RESTART: ↻   SESSION STATUS: running   CURRENT BOX: 1

click to stop session     click to pause session     click to move to box 2     or select box from list
01: Introduction to MAPS

**Device details** switch to box view

| Device | Device Information | | % Complete | Current Box | Portfolio |
|---|---|---|---|---|---|
| | Connected ? | Status | | | |
| Clark Kent | ✘ | inactive | -- | 0 | ▦ |
| Karen Pernyes | ✔ | active | ▰▰▰▰▰▰(100) | 1 (viewing 4) | ▦ |
| Karl Buckland | ✘ | inactive | -- | 0 | ▦ |
| James Hickens | ✘ | inactive | -- | 0 | ▦ |
| Frances Boxer | ✘ | inactive | -- | 0 | ▦ |
| Alfie Wingfield | ✔ | active | ▰▰▰▰▰▰(100) | 1 (viewing 2) | ▦ |
| George Wingfield | ✔ | active | ▰▰▰▰▰▰(100) | 1 (viewing 3) | ▦ |

*Teacher Review of Student work:*
Teachers can review the student work at any stage once the task has been started by clicking on the portfolio icon for the student, which then gives access to the storyboard portfolio in the same way as for the student. Each element of work within the storyboard portfolio is a hyperlink to the piece of work, which can be clicked on to 'expand' the work:
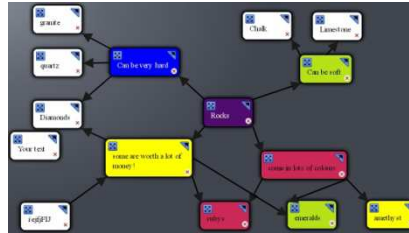


*Teacher/Student Feedback:*
Via the student portfolio the teacher is able to leave feedback and guidance (text or audio) for the student on each stage of the portfolio. This can be formative feedback whilst the task is on-going or summative feedback once the task has been completed. When feedback has been left, this is accessible to the student via a 'green' coloured speech bubble in the top right corner of each stage 'box' within their portfolio:
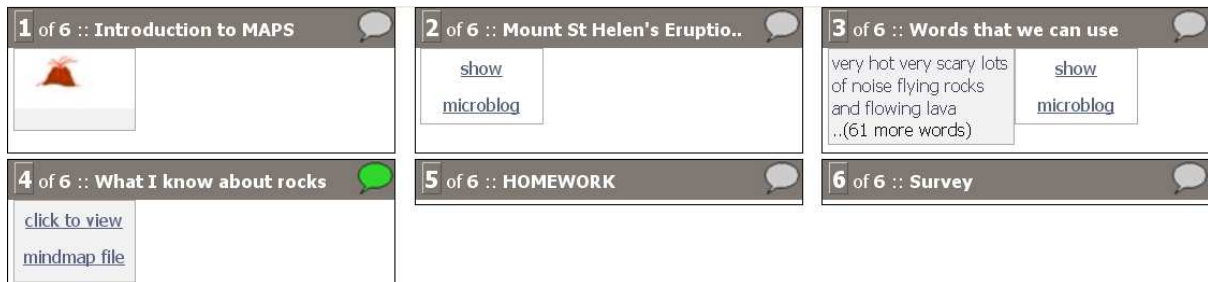


System analytics of Student work – semantic indexing (quantative analysis):
MAPS now includes advanced text/data mining techniques which has enabled us to create an automated 'marking assistant' within the system that models teacher marking behaviour. This marking assistant automatically searches through the text based evidence created by the students, be this in Facebook, Twitter or the in-built MAPS micro-blogging tool looking for the key words, phrases and inferred references to the criteria that the teacher created within the task rubric. The marking assistant tags these references to the rubric, which the teacher can then validate:

The system records how many instances of each key word and/or phrase has been referenced by the student by inserting a number in brackets after each criterion tag:
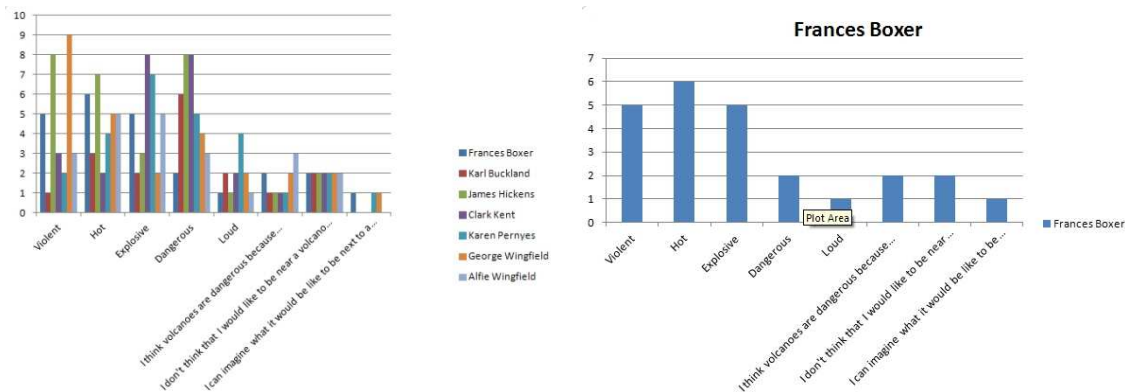


*System analytics of Student work – semantic indexing (qualative/contextual analysis):*
Having tagged the student work against the key words/phrases or inferred references, the marking assistant creates hyperlinks to the location within the student work where the key words/phrases or inferred references have been made by the student. On clicking the link the system launches the Red Pen Tool, a browser based annotation and tagging mark-up tool that will contextually show where the marking assistant believes that the student has evidenced a key words/phrases or inferred reference contextually within the student's work. If the references to the key words/phrases are located in multiple pieces of evidence, then the system will create a list of the relevant pieces of student evidence and allow the teacher to navigate to each piece through the Red Pen Tool in turn. If there are multiple references to the same key words/phrases or inferred references within the same piece of evidence, then Red Pen Tool will allow the teacher to search the work just for the different instances of each key words/phrases, etc.
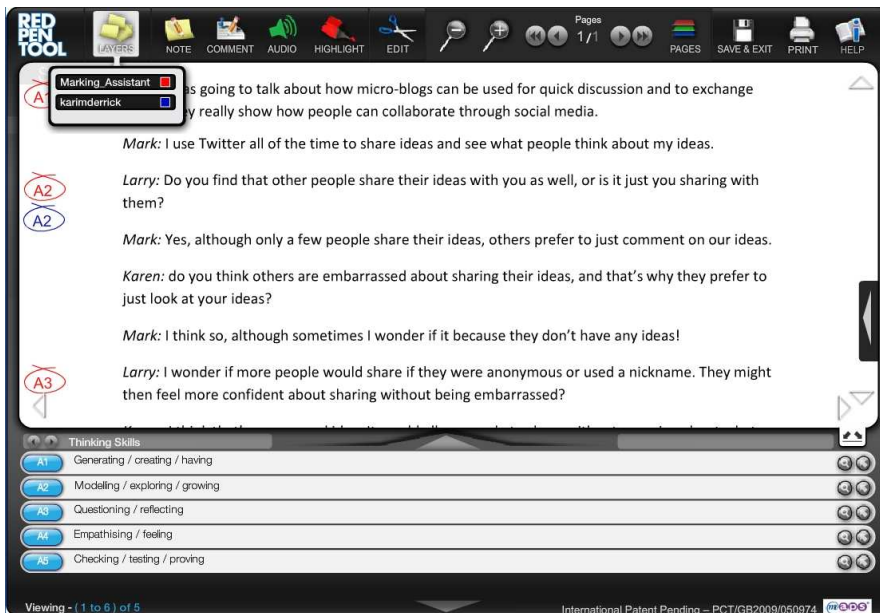
*System analytics of Student work – semantic indexing (graphical):*
In addition to being able to access raw data indicating which key words/phrases or inferred references have been met by the student and enabling the teacher to validate these references contextually within the student evidence via the Red Pen Tool, we also plan to extend the functionality of the system to offer teachers with the ability to see the underlying reference data graphically, either by key words/phrases or inferred references for the whole group or just one student:



*System analytics of Student work – social networking (data):*
In addition to automatically searching student work and collaborations for key words/phrases and inferred references, MAPS in-build Social Networking Analysis (SNA) tools automatically track the interactions and dynamics of the interactions between students through their social media based collaborations, giving the teacher an insight into the individual and group dynamics involved in the collaborative work. This is particularly useful when the student work involves interactions that take place informally outside of the classroom where the teacher cannot observe these interactions, and also when working with larger groups in the classroom – freeing up the teacher to focus on the individual needs of the students, rather than trying to monitor and observe everyone.

The MAPS SNA system uses three measures of interaction and group dynamics (Centrality):
- **Closeness** – the measure of direct vs. in-direct communications;
- **Betweeness** – the control a person has over communications with others;
- **Degrees** – the number of direct connections a student has.

| User | | closeness | | betweenness | | degrees | | Criterion |
|------|--|-----------|--|-------------|--|---------|--|-----------|
| Social Newtworking | | | | | | | | Hide SNA Results |
| spstb_101 test | | 0.86 | | 0.67 | | 5 | | 0% |
| spstb_102 test | | 0.75 | | 0 | | 4 | | 0% |
| spstb_103 test | | 0.86 | | 0.67 | | 5 | | 0% |
| spstb_104 test | | 1 | | 3.17 | | 6 | | 0% |
| spstb_105 test | | 0.86 | | 1.5 | | 5 | | 0% |
| spstb_106 test | | 0.6 | | 0 | | 2 | | 0% |
| spstb_107 test | | 0.67 | | 0 | | 3 | | 0% |

*System analytics of Student work – social networking (graphical):*
MAPS' SNA tools also represent the three measures of Centrality in graphical format, so that the teacher can quickly see how the interactions and dynamics are working within a group or class for a given task, and can then intervene as appropriate.



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