Engaging students through Social Media - Empowering Assessment Analytics

Proposing Organisation:

TAG Assessment (www.tagassessment.com)

Main Presenter:

Matt Wingfield, Managing Director TAG Assessment and Chairman of The eAssessment Association.

Main Presenter Contact Details:

- E-Mail: matt.wingfield@tagassessment.com
- Telephone: +44 203 176 0394

Co-Presenter:

To be confirmed.

Abstract:

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.

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:

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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.

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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:

CLiveAssess Total: 00:10:0 Box 4: 00:00:0		User: alfie_wingfield Connected:	
Words that we can use			
In your group (your teacher will tell you which g	oup you are in) put up your list of words. <u>Access grou</u>	p portfolio text here	
Read y our partners piece by looking at the group they have missed out? Put y our partners name at 	portfolio and choosing it. Write a critique of your partners the top. <u>Access group portfolio text here for the critiqu</u> al list of words on the microblog.	price. Is there anything that you agree w	with or
	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:



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:

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Earth Science -	- Volcanoes - in Restart:	progress	; ON STATUS: run	ing CURREN	Ne: TBOX: 1	d refresh in 1 s	econds - <u>force</u>	refresh
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Karl Buckland	×	inactive	(**)		0			
James Hickens	×	inactive	-		0		-	
Frances Boxer	×	inactive	-		0			
Alfie Wingfield	~	active	(10	0)	1 (viewing 2)		-111	
George Wingfield	1	active	(10	0)	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:

1 of 6 :: Introduction to MAPS	2 of 6 :: Mount St Helen's Eruptio 🗩	3 of 6 :: Words that we can use
×	show microblog	very hot very scary lots of noise flying rocks and flowing lava (61 more words)
4 of 6 :: What I know about rocks 🛛 🗩	5 of 6 :: HOMEWORK	6 of 6 :: Survey
click to view mindmap file		

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:

mads/~	1				2	(*)	A			2
MANAGED + PORTFOLIDE	H	ome	Newsfeed	Journal	Assets	Classes	Inbox	Profile	Users	Tasks
	Journal	Ass	ets Newsf	eed Profi	le Task:	5				
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	Technolo	gy er	manceu cu	maporatio						
A.	ict <u>Level 3</u>)	Level 4	Level 5 Level	<u>6 Level 7 Leve</u>	18					
Larry Page	Singapore	Assess	ment Scheme							
(Student)										
ournal	Start date	16/1:	1/2011, End da	ate: 30/11/20	11				1	
Manage									-	2
II <u>Timeline</u>		to sh	about how te- are thoughts a	chnology can l ind ideas.	be used to hel	p us collabor	ate with each	other more a	nd 🥘	- O
My Newsfeed	Description	You o more	an choose to t , for example	alk about any mobile phone	aspect of tec s, e-mail or s	hnology, whe ocial networki	re this helps u ing.	s collaborate		1
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Un-assign task	Status	Open								
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o Add work	Checklist	over	view: Thin	king Skills						
RedPen Tool					Larry Pac	ie i	<u>Mr. De</u>	rrick	Markin	g Assistant
	Thinking Skills								Mark R	anges: 0 - 0
0 <u>Send message</u>	generating /	creating	/ having							2
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Task Timeline	guestioning /	reflecti	ng							2
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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:

Checklist overview: Thinking Skills						
	Larry Page	<u>Mr. Derrick</u>	Marking Assistant			
Thinking Skills			Mark Ranges: 0 - 0			
generating / creating / having			(3)			
modelling / exploring / growing			(1)			
<u>questioning / reflecting</u>			(5)			
empathising / feeling			(D)			
checking / testing / proving			□ (0)			

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.

RED FEN TOOL		
A	In Assistant so going to talk about how micro-blogs can be used for quick discussion and to exchange denick v really show how people can collaborate through social media.	
	Mark: I use Twitter all of the time to share ideas and see what people think about my ideas.	
A2 A2	Larry: Do you find that other people share their ideas with you as well, or is it just you sharing with them?	
	Mark: Yes, although only a few people share their ideas, others prefer to just comment on our ideas.	
	Karen: do you think others are embarrassed about sharing their ideas, and that's why they prefer to just look at your ideas?	п
	Mark: I think so, although sometimes I wonder if it because they don't have any ideas!	1
(A3)	Larry: I wonder if more people would share if they were anonymous or used a nickname. They might	
4	then feel more confident about sharing without being embarrassed?	$\triangleright^{\bigtriangledown}$
CO Thi	nking Skills	
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(A5) Cł	necking / testing / proving	00
Viewing - (1	to 6) of 5 International Patent Pending - PCT/GB2009/	050974 @@@@

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.

		Social Newtworkin	9	Hide SNA Results
User	closeness	betweenness	degrees	Criterion
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.

