Progress with FaSMEd

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Project partners

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IL CORSO DI NUOTO

Lo scorso anno scolastico, i 90 bambini di una scuola dell'infanzia sono andati al corso di nuoto della piscina comunale. Avevano a disposizione, come da regolamento, 15 istruttori. Quest'anno i bambini della stessa scuola sono 30 in più: quanti istruttori avranno a disposizione in piscina? 23 ISTRUTTORI

<table>
<thead>
<tr>
<th>90 + 30 = 120 BAMBINI</th>
<th>IN TUTTO L'ANNO DOPO</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>x 15</td>
</tr>
<tr>
<td>180</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>120</td>
</tr>
<tr>
<td>GLI ISTRUTTORI IN PIÙ</td>
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</table>

Spiega come hai ragionato

Dell'anno scorso
ABBiamo aggiunto al 90 BAMBINI 30 BAMBINI che sono uniti al corso di nuoto eveniva 120. Poi abbiamo diviso i bambini per gli istruttori e veniva 8 che sono gli istruttori in più. Dopo abbiamo fatto 15 gli istruttori dell'anno scorso più gli istruttori dell'anno dopo e veniva 23 che sono gli istruttori per 120 bambini.

La piscina avrà a disposizione 8 istruttori in più.
1ª STRATEGIA

$90 : 15 = 6$ bambini per ogni istruttore

$30 : 6 = 5$ istruttori

$120 : 15 = 8$ istruttori in più

$15 + 5 = 20$ istruttori di quest'anno

$8 + 15 = 23$

2ª STRATEGIA

$90 + 30 = 120$ bambini di questo anno

$90 : 15 = 6$ bambini per ogni istruttore in più

$15 \times 8 + 105$

3ª STRATEGIA

$90 + 30 = 120$

$120 : 15 = 8$ istruttori in più

$15 \times 8 + 55$
Nom: Camil Achache

QU’EST-CE QUE JE SAIS FAIRE AVEC LES FRACTIONS?

Les coder et les décodier
Les lire et les écrire
Reconnaître et donner des égalités
Les placer sur une graduation
Les lire sur une graduation
Les comparer
Book Assessment  Total 5 Marks

1. Handwriting
2. Dates + Heading
3. Illustrations
4. Text-NB covered
5. Use of ruler/pen

Due Date: 24.2.2016
Research questions

- How do teachers **process** formative assessment data from students using a range of technologies?

- How do teachers **inform their future teaching** using such data?
Formative assessment and technology

iPads in mathematics lessons

Prior to the lesson, teachers used iPads to:

• Send questions to students and receive answers
• Make assessments of students’ knowledge and common misconceptions
• Use their assessments to adapt lesson plans.

During the lesson, teachers used iPads to:

• Send questions to students and receive answers
• View students’ solutions or work in progress and select samples to display for class discussion
Case study 1: Matthew

Distance-time graphs
- Sending questions and receiving responses from students using Showbie
- Selecting and displaying sample student work for class discussion
- Peer assessment and self-reflection

The meatball problem
- Students working collaboratively
- Class discussion

Algebraic equations
- Computer-led adaptive questioning
- Paired discussion and peer assessment of sample work
Case study 2: Carol

Lesson 1: Algebraic expressions
• Sending questions and receiving students’ responses using NearPod
• Selecting and displaying sample student work for class discussion

Lesson 2: Directed numbers
• Pre-lesson diagnostic work using diagnosticquestions.com website
• Collaborative work on card-sort
• Photographs of student work displayed for class discussion

Lesson 3: ‘Magic V’ investigation
• Pre-lesson diagnostic questions using NearPod
• Some collaborative work
• Interim work displayed for class discussion
Intervention cases

The lessons
1. Distance-time graphs
2. The meatball problem
3. Algebraic equations
4. Algebraic expressions
5. Directed numbers
6. ‘Magic V’ investigation
7. Tessellations
8. Areas and perimeters
Initial observations

- Technology can bring benefits but also disadvantages.
- Replicating effective paper-based methods with an iPad does not necessarily result in the same outcomes.
- Some information provided by the technology may not be useful.
- Use of technology needs to be accompanied by suitable pedagogy.
- Having good technical support systems is essential.
- There are benefits in each student having an iPad of their own all the time rather than using class sets.
- Technical confidence in teachers and students can facilitate better creativity and flow of lessons.
Formative assessment areas

How is the technology used when:
• Building on students’ prior knowledge?
• Identifying and responding to students’ conceptual difficulties?
• Using questioning?
• Increasing student collaboration?
• Enabling students to become assessors?
Examples of the uses of technology in formative assessment processes

**Building on students’ prior knowledge:**
Pre-lesson diagnostic assessment and class overviews are used in lesson planning.

**Identifying and responding to students’ conceptual difficulties:**
Sample student work is selected and displayed to expose misconceptions.

**Using questioning:**
Student work is displayed and students are questioned about their methods.

**Increasing student collaboration:**
Students compare and discuss their work even when working on individual iPads.

**Enabling students to become assessors:**
Peer assessment takes place during class discussion and collaborative work.
Our analysis (1)

1. Identification of Thompson and Wiliam’s (2007) five strategies within the lessons.

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Where the learner is going</th>
<th>Where the learner is right now</th>
<th>How to get there</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A. Clarifying learning intentions and criteria for success</td>
<td>B. Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding</td>
<td>C. Providing feedback that moves learners forward</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peer</th>
<th>Understanding (shared) learning intentions and criteria for success</th>
<th>D. Activating students as instructional resources for one another</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Learner</th>
<th>Understanding learning intentions and criteria for success</th>
<th>E. Activating students as the owners of their own learning</th>
</tr>
</thead>
</table>
Our analysis (2)

2. Identification of teacher-led or student-led processes over different time spans and the ‘nesting’ of these within each other.

EXAMPLE

Teacher sends question electronically → Students work on their responses → Teacher receives responses electronically → Teacher selects samples for display and discussion to expose misconceptions

- Students discuss and collaborate with each other
- Students engage in peer assessment, self reflection and adjustment to thinking
3. Classification of the functions of digital technology as:
   – sending and sharing
   – processing and analysing
   – providing an interactive learning environment.
Fasmed framework
Our analysis (4)

4. Mapping of the processes of formative assessment enacted in each lesson.
   i. Identification of key points of interaction and possible synergy between technology and teacher pedagogy.
   ii. Identification of key teacher actions that utilise the information provided by the technology for formative assessment purposes.
ASK
Elicit information by questioning or observing.

ANSWER
Respond orally, in writing or via technology.

ANALYSE
Interpret response, offer and interpret feedback.

ADAPT
Modify teaching and learning

Teacher asks question

Peer asks question

Technology asks question

Teacher adapts question or lesson

Student modifies response to question

Student interprets feedback

Processing and feedback provided by technology

Interpretation and feedback provided by peer

Interpretation and feedback provided by teacher
The teacher sends a question to the students electronically – the students work individually on their iPads to find solutions and record their methods – the students then compare and discuss solutions with each other in groups – individual students receive feedback on their solutions from their peers – individual students interpret the feedback, adjust their thinking and produce improved solutions.
The teacher sends a question to the students electronically – the students work individually, record their solutions, with their working, on their iPads and send these electronically to the teacher – the teacher displays a sample student response and asks the class to comment on the solution - the students provide feedback on the sample student response. The teacher may also provide feedback. The student interprets this and is challenged to rethink their solution.
EXAMPLE 3

Multiple-choice questions are written by the teacher and sent electronically to the students prior to the lesson – the students send their responses back electronically – the computer marks the student work and processes the class set of responses – the computer provides feedback to the teacher in the form of a visual summary of the correct and incorrect responses to each question for the whole class (e.g. bar chart) – the teacher interprets this information and adjusts their lesson plan to focus on the areas of conceptual understanding that are highlighted as requiring development.
The technology generates a series of questions that have not been directly selected or written by the teacher - students respond individually - students record their responses on the computer - the technology processes each response and sends back a cumulative summary to the teacher that they can access at time to gain an overview of progress at that instant. The technology also provides feedback to the student on each question as they complete it and adapts the next question, making it easier or harder depending on the response elicited. This cycle is repeated.
Questions and comments

• What part of this is most useful for teachers?
• What else would be useful in a web-based professional development ‘toolkit’ for teachers?
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