How to Engage First-year Students with Different Levels of Mathematical Skills in learning Engineering Mathematics using Technology: A Case Study

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How the new generation learns?
Students having very diverse backgrounds in Maths
Students having very diverse backgrounds in Maths- Examples

\[
\frac{(x+1)3x^2 - x^3}{(x+1)^2} = \frac{3x^2 - x^3}{(x+1)^2}
\]

\[
\frac{2x^3}{(x+1)^2} - \frac{3x^2 + 3x^2 - x^3}{(x+1)^2} = \frac{x^2(3x+3-x)}{(x+1)^2}
\]

\[
x^3(3x+3-x) = x^3 \frac{x^2+2x+1}{x^2}
\]

\[
x^3(x+1)
\]
Students having very diverse backgrounds in Maths - Examples
Methods adopted for giving feedback

Marking by lectures

Interactive assessment and feedback tool

Peer assessment
Use of technology can save time

<table>
<thead>
<tr>
<th>Courses Taught</th>
<th>Course Leading (%)</th>
<th>Students</th>
<th>Credits</th>
<th>Proportion Whole Class Teaching</th>
<th>Proportion Small Group Teaching (Seminar / Tutorial)</th>
<th>Proportion Assessment</th>
<th>Taught Period</th>
<th>Proportion of whole class teaching allocated to small group Teaching</th>
<th>Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH1062 Mathematics 1A/1B (BSc)</td>
<td>100%</td>
<td>19</td>
<td>30</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>T1-T3</td>
<td>100%</td>
<td>118</td>
</tr>
<tr>
<td>MATH0027 Mathematics 1A/1B (BEng)</td>
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<td>35</td>
<td>30</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>T1-T3</td>
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<td>100.00%</td>
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<td>100.00%</td>
<td>T1-T3</td>
<td>100%</td>
<td>100</td>
</tr>
</tbody>
</table>
A matrix is a rectangular array of numbers or expressions. For example,

\[
\begin{pmatrix}
3 & 1 & 2 \\
0 & -6 & 2
\end{pmatrix}
\begin{pmatrix}
a & B \\
7 & 8
\end{pmatrix}
\begin{pmatrix}
3 - \lambda \\
7 & 6
\end{pmatrix}
\]

are all matrices. Note that the plural of matrix is matrices.

We often denote a matrix by a capital letter, for example

\[A = \begin{pmatrix}
4 & 1 \\
3 & 6 \\
-1 & 0
\end{pmatrix}, \quad B = \begin{pmatrix}
1 & 0 & -1 \\
6 & 1 & 4
\end{pmatrix}\]

The size of a matrix is given by the number of rows and the number of columns. If matrix \(A\) has three rows and two columns, its size is described as a 3-by-2 matrix.
online assessment tool- Survey

Do you think My Mathlab allows you to learn Mathematics Flexibly?

- Definitely Agree
- Mostly Agree
- Neutral
- Mostly Disagree
- Definitely...

Does MyMathlab help you to learn independently?

- Definitely Agree
- Mostly Agree
- Neutral
- Mostly Disagree
- Definitely...

What do you like most about MyMathlab?

- Instant Feedback
- Regular assignments that let me learn on weekly basis
- Gaining confidence that I can learn myself
- Ability to learn A-level topics that I had not learnt before
PEER Assessment
The final exam mark of BEng students showed a correlation of 0.39 (p-value=0.037) with the time they spent using MyMathlab.
Conclusions

Technologies → Engagement

Confident  Useful  Time saver
Happy

MyMathLab Global
References

- A comprehensive guide which includes many case studies. Available at [http://www.jisc.ac.uk/media/documents/publications/enhancinglearningthroughtechnology.pdf](http://www.jisc.ac.uk/media/documents/publications/enhancinglearningthroughtechnology.pdf)
THANK YOU!