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## CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A Teaching Experiment in Constructing the Limit of a Sequence</td>
<td>Pham Sy Nam and Max Stephens</td>
</tr>
<tr>
<td>21</td>
<td>Teaching Problem Solving in Secondary School Mathematics Classrooms</td>
<td>Toh Tin Lam, Tay Eng Guan, Quek Khiok Seng, Leong Yew Hoong, Toh Pee Choon, Ho Foo Him and Dindyal Jaguthsing</td>
</tr>
<tr>
<td>44</td>
<td>Understanding Preservice Teachers’ Development of Pedagogical Knowledge Practices when Co-Teaching Primary Science to Peers</td>
<td>Peter Hudson</td>
</tr>
<tr>
<td>67</td>
<td>Representational Competence among Malaysian Chemistry Students: Unearthing the Conceptual Hitches</td>
<td>Sim Joong Hiong and Esther Gnanamalar Sarojini Daniel</td>
</tr>
</tbody>
</table>
Representational Competence among Malaysian Chemistry Students: Unearthing the Conceptual Hitches

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Developing representational competence early in chemistry education is important. However, research to uncover students’ difficulties with representational competence of basic chemical concepts in the early years of their chemistry course is scarce. The purpose of this study was to investigate and identify these difficulties. A total of 384 Malaysian Form 4 science students (mean age=16 years) participated in this study. Five categories of representational competence were assessed. Quantitative data were obtained from an instrument namely the Test of Representational Competence (TRC). Findings showed majority of the participants encountered difficulties interpreting chemical representations (66%), making connections between representations and concepts (51%), using representations to generate explanations (73%), as well as translating between representations across the three levels: macroscopic, submicroscopic and symbolic (79%). Comparing the percent mean difficulty, it could be concluded that the participants encountered most difficulty translating between different representations across levels. Several implications arising from the findings are also put forward.

Keywords: Chemistry students, representational competence, students’ difficulties