What’s in the CAPS Package?
A Comparative study of the National Curriculum Statement (NCS) and the Curriculum and Assessment Policy Statement (CAPS): FET Phase

Physical Sciences

11 June 2014

Dr Sharon Grussendorff
Documentation

- NCS (5 subject documents):
  - NCS Subject Statement (Gr 10 – 12) Physical Sciences,
  - Learning Programme Guidelines,
  - Subject Assessment Guidelines,
  - Examination Guidelines, and
  - Physical Sciences Content Document (2006)

- CAPS (1 subject document):
  - Curriculum and Assessment Policy Statement (Gr 10 – 12) Physical Sciences
  - Subsequently an Exam Guidelines doc has been released
Documentation

- CAPS was considered well structured, and more user-friendly and accessible, with simpler language than NCS.
- Concern with CAPS was numerous early versions and errors, due to rushed implementation.
- CAPS has better alignment than NCS, with all relevant information in one document. NCS had numerous inconsistencies across documents.
- With release of Examination Guidelines document (2014) alignment issues could be introduced.
Objectives

- **Similarities** between NCS and CAPS:
  
  - Objectives related to construction and application of scientific knowledge, and to the environment and society

- **Differences**:
  
  - Only the NCS refers to issues related to socio-political and ethical awareness, eg “correcting some of these historical limitations”, “ethical and responsible attitude”, and “sensitivity to cultural beliefs, prejudices and practices in society”
  
  - Only the NCS mentions development of skills related to self-employment and entrepreneurial ventures

- In brief, the objectives of CAPS are **more traditional**, and **less idealistic**, than those in NCS.
Breadth and Depth of Content & Skills

Methodology

- To compare content breadth: The sub-topics were tabulated and totalled for each grade and for the full FET curricula.

- To compare content depth: The depth of the content was estimated using a scale of 4 levels:
  
  1 = introductory; superficial; definitions and descriptions
  
  2 = involving simple relationships and numerical work
  
  3 = involving deeper relationships, complex computations and interpretations
  
  4 = high level of abstraction; conceptually challenging; complex understanding of relationships; demanding mathematical computations and problem solving
Content Breadth per Grade

Graph 1: Total Number of Topics per Grade

<table>
<thead>
<tr>
<th></th>
<th>NCS</th>
<th>CAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gr 10</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>Gr 11</td>
<td>53</td>
<td>37</td>
</tr>
<tr>
<td>Gr 12</td>
<td>36</td>
<td>16</td>
</tr>
<tr>
<td>Matric Exam</td>
<td>55</td>
<td>52</td>
</tr>
</tbody>
</table>
Content Breadth per Grade

- **Grade 10:** similar breadth, with a slight increase in the CAPS – concerns about this being too broad

- **Grade 11:** reduction from NCS (53) to CAPS (37) - appropriate breadth of content (**BUT** in practice teachers and subject advisors report that curriculum is rushed)

- **Grade 12 exam:** NCS (55) is slightly greater than CAPS (52) - not likely to impact on learner performance
Overall breadth has been reduced from NCS to CAPS.

Important shift, since Umalusi (2010) found the NCS curriculum too broad in comparison with equivalent international qualifications.
Graph 3: Total depth score per Grade and Phase

<table>
<thead>
<tr>
<th>Grade</th>
<th>NCS</th>
<th>Matric Exam</th>
<th>FET Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gr 10</td>
<td>2.70</td>
<td>2.84</td>
<td>2.69</td>
</tr>
<tr>
<td>Gr 11</td>
<td>3.09</td>
<td>2.88</td>
<td>2.84</td>
</tr>
<tr>
<td>Gr 12</td>
<td>3.08</td>
<td>2.85</td>
<td>2.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAPS</td>
<td>FET Phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.79</td>
<td>2.79</td>
</tr>
</tbody>
</table>
Depth of Content

- **NCS:**
  - Depth of Grade 11 (3.1) >> Grade 10 (2.7)
  - Grades 11 and 12 have high percentage of Level 4 content (30% and 29%)

- **CAPS:**
  - More even increase in depth score across grades
    - Gr 10 = 2.69, Gr 11 = 2.84, Gr 12 = 2.89
  - More appropriate spread of content at various depths
Comparison of Depth

- Depth for **matric exam** content is very similar
  - NCS = 2.84,  CAPS = 2.85
  - CAPS has some new topics which are examinable (eg Newton’s Laws and Acids and Bases)

- Across the **whole FET phase**, there has been a slight reduction in the overall depth
  - NCS = 2.88,  CAPS = 2.79

- Conclusion is that depth is appropriate
Skills Coverage

- In **NCS** skills are described in a very generic way in LOs and ASs
  - Eg “communicating and presenting information and scientific arguments”
  - Intention was for these to become more specific to the content area at the level of classroom practice
  - However, a teacher not familiar with the specific skills of Physics and Chemistry will not incorporate these into his/her teaching.
- Conclusion: skills are **underspecified** in NCS
Skills Coverage

- In **CAPS** skills are clearly articulated in prescribed activities and teaching guidelines
  - Eg “Measure the boiling point and melting point of water and determine the heating curve and cooling curve of water”
- Particular skills were identified from the document, and the number of times these skills are mentioned was noted
Skills Coverage

• **Problem solving** skills are under-represented (10%)
  - CAPS does mention that learners should do at least two problem solving exercises daily, but if a teacher closely follows the work schedule, this is not guaranteed
  - Unit conversions are mentioned very seldom

• **Diagrammatic skills** (including tables and graphs) are under-represented (8%)

• **Experimental skills** are well covered (35%)

• **Written work** (descriptions, discussions, explanations and reports) is over-represented (47%)
Specification of Content

- For NCS, specification is **low**
  - Eg “*Types of reaction: acid-base and redox reactions*”
  - Much was left up to the teacher to interpret
  - Teacher was required to design learning activities
  - Intended to allow the teacher a high degree of creativity and flexibility
  - Led to a great deal of confusion and inconsistency
Specification of Content

- For CAPS, specification is high
  - Eg “Determine the oxidation number from a chemical formula and electronegativities • Identify a reduction-oxidation reaction and apply the correct terminology to describe all the processes • Describe oxidation-reduction reactions as involving electron transfer • Describe oxidation-reduction reactions as always involving changes in oxidation number • Balance redox reaction equations by using oxidation numbers via the ion-electron method”
  - Includes time allocations, prescribed activities, resource materials and teaching guidelines
  - Helpful for teachers who lack subject confidence
  - Too restrictive for confident, creative teachers if implemented in a rigid way
Pacing

- Specification of pacing
  - Low in NCS, high in CAPS

- Actual pacing
  - Fast in NCS (due to breadth)
  - Pacing in CAPS is fast for Gr 10, medium for Gr 11 and Gr 12

- In CAPS there are contradictions in the amount of time allocated to teaching topics
Sequencing

- Sequence of topics appropriate in Gr 11 and 12
- Gr 10 – discontinuities in sequencing

<table>
<thead>
<tr>
<th>Grade 10 Sequencing of Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term number</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Term 1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Term 2</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Term 3</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Term 4</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Progression within grades

- **NCS**
  - Sequence within grades was left to teacher / education departments
  - Hence progression could not be commented on

- **CAPS**
  - Sequence is clearly prescribed
  - Reasoning behind sequencing is not clear
  - No clear evidence of progression within grades
Progression across grades

- **NCS**
  - Moderate progression across grades
  - Gr 10 includes some challenging topics eg graphs and equations of motion for transverse waves
  - Gr 11 high proportion of deep content

- **CAPS**
  - Moderate progression across grades
  - Gr 10 includes some challenging topics eg graphs and equations of motion for accelerated motion, EM waves

- More consideration could be made to content at appropriate level of demand for each grade
Pedagogy

- **NCS** based on OBE adopts learner-centred constructivist approach to knowledge development.
  - Guidelines given are very general
  - Difficult to realise in practice

- **CAPS** uses content-based teacher-centered approach
  - Includes very clear content and teacher guidelines
  - Supports a more meaningful learning experience, particularly in contexts where teachers struggle to plan their own work schedules
  - Too restrictive for confident, creative teachers?
Assessment

- Similar number and types of tasks in NCS and CAPS, but much more prescriptive in CAPS
  - Experiments, investigations, projects, research tasks, control tests and examinations
  - Together these cover the range of skills required in a Physical Science course
- However, greatest weighting is given to tests and examinations (85% of the final mark)
  - Test a particular range of skills
  - Assessment of experimental and reporting skills, and open-ended investigation, are under-represented
Implications for SA Context

- Clearer specification of content in CAPS is good for majority of SA teachers who lack subject confidence

- Prescribed practical activities require specialised scientific equipment
  - eg air-track with blower, mercury discharge lamp; photosensitive vacuum tube; set of light filters;
  - Fewer than 5% of South African schools will be able to implement the practical requirements of CAPS (stats from Equal Education, 2012)
Exit-Level Attainment

- Exit level content and skills were tabulated.
- According to the evaluation team, all of the key skills and content topics are adequately covered in the Grade 12 examinable curriculum (exit level).
- Good correlation between time allocation and exam weighting of topics.
- No obvious omissions of core content or skills were noted by the evaluation team.
Conclusions

- **Breadth and depth:**
  - Not much shift in examinable content from NCS to CAPS
  - **Breadth and depth** of CAPS is appropriate across FET phase
  - **Skills** are explicit and well represented in CAPS, but more emphasis needed on problem solving and graphical skills
Conclusions

- CAPS statements are more **clear, succinct, unambiguous and measurable** than NCS

- CAPS is more **discipline-based**, with fewer references to IKS, society and environment
  - **Good** in terms of clearer boundary definitions, and hence preparation for tertiary studies
  - **Loss** in terms of emphasis on social justice, contextualisation and broad scientific literacy
Recommendations

- **Grade 10** curriculum needs attention:
  - Remove excessively demanding topics and those that are repeated in Gr 11
  - Sequencing should be more coherent and developmental, less discontinuous

- Make allowance for **under-resourced schools**, especially in practical component

- Increase the emphasis on **problem solving** and **diagrammatic skills**

- **Edit** the CAPS for typographic and spelling errors, and consistency of terminology