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

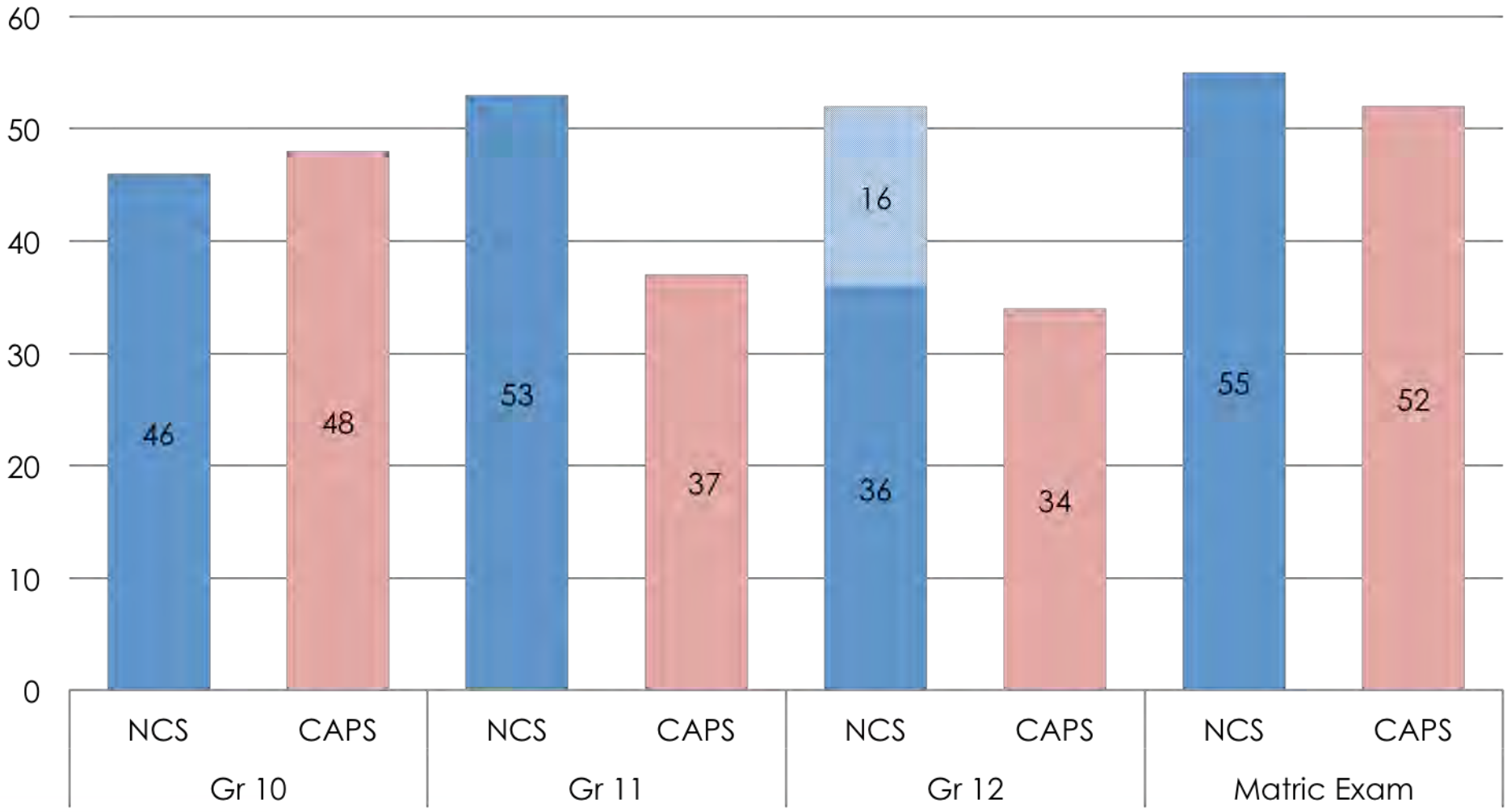
  2 = involving simple relationships and numerical work

  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

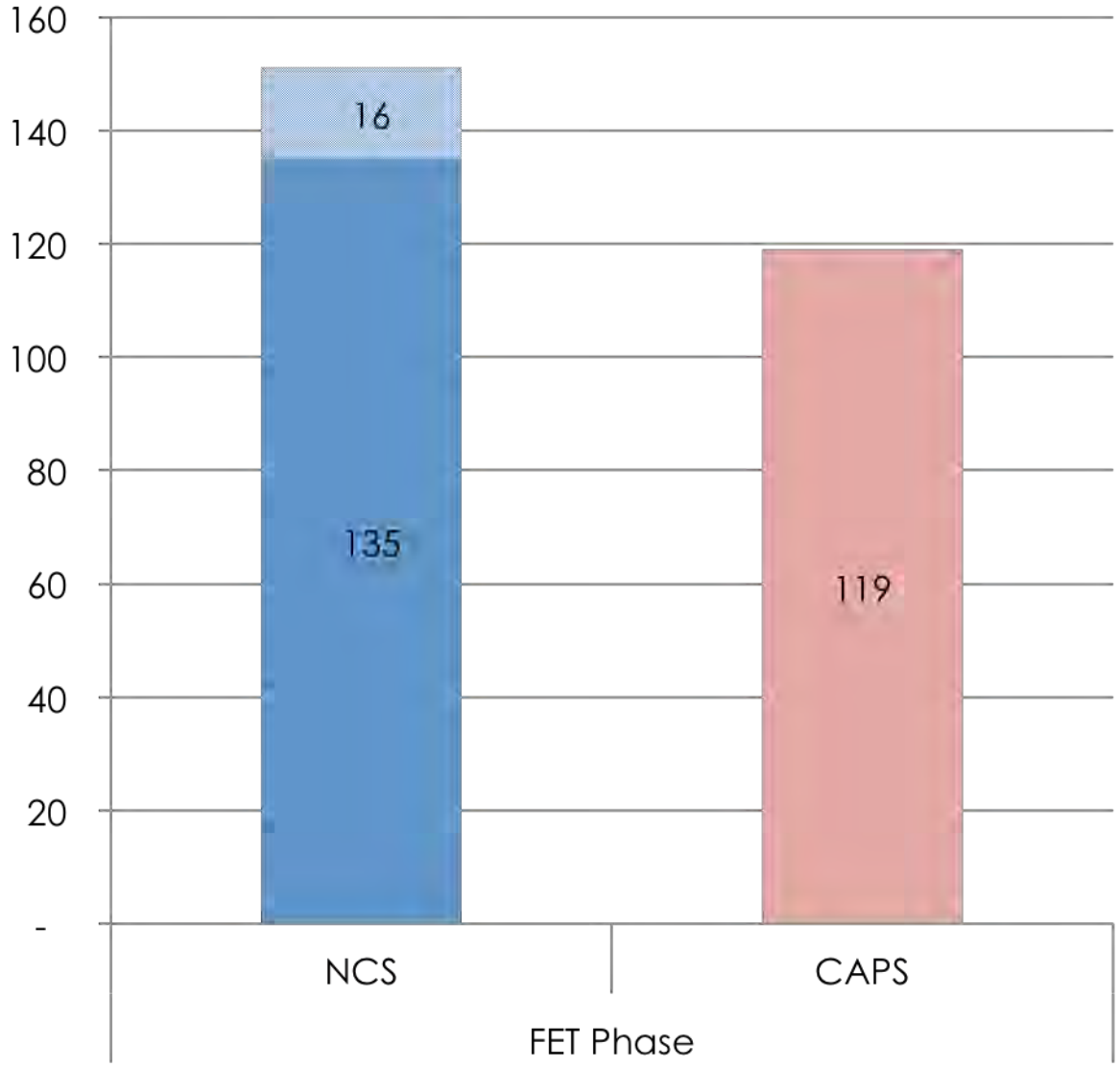
Graph 1: Total Number of Topics per Grade



Content Breadth per Grade

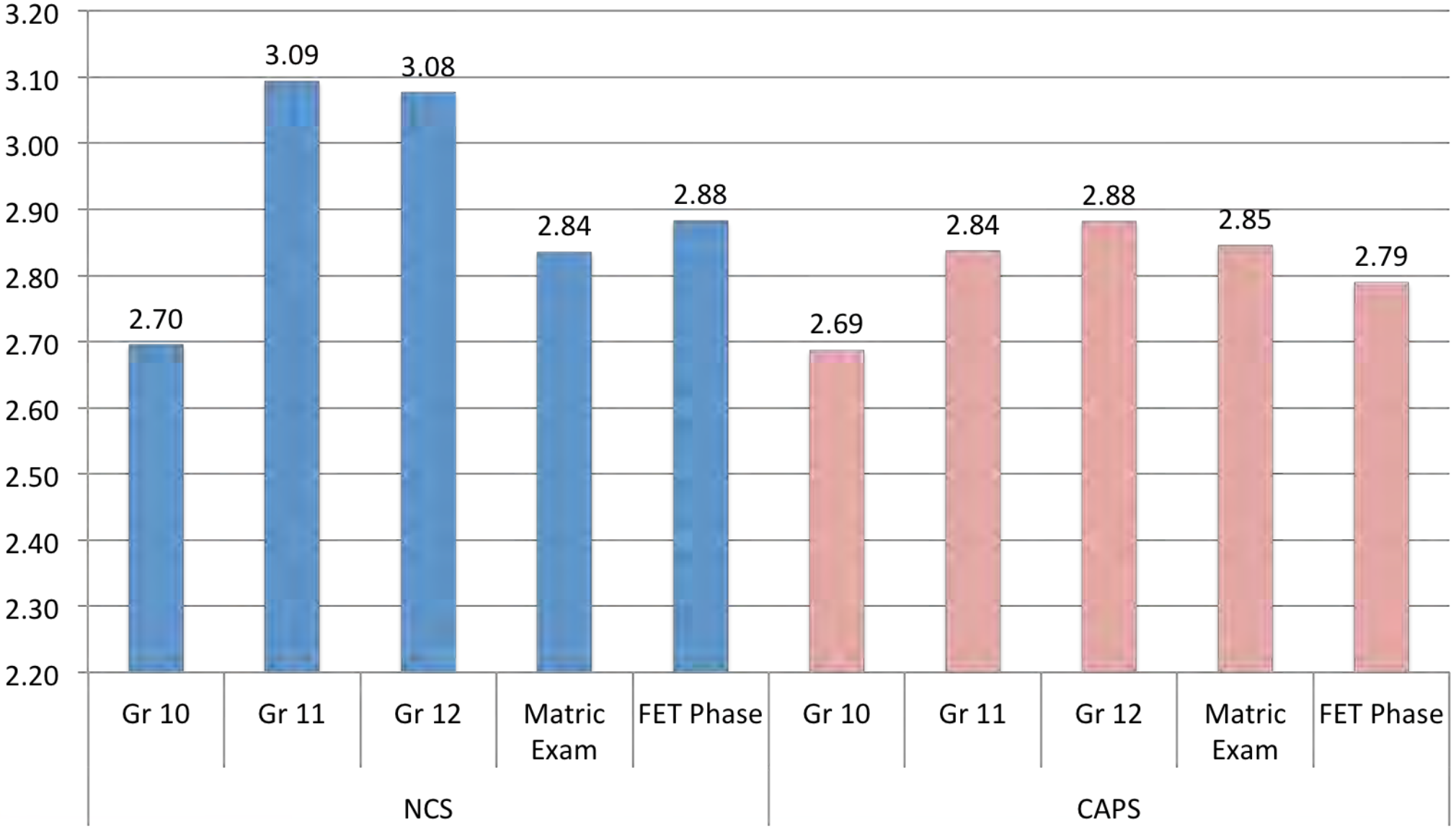
- **Grade 10:** similar breadth, with a slight increase in the CAPS – concerns about this being too broad
- **Grade 11:** reduction from NCS (53) to CAPS (37) - appropriate breadth of content (**BUT** in practice teachers and subject advisors report that curriculum is rushed)
- **Grade 12 exam:** NCS (55) is slightly greater than CAPS (52) - not likely to impact on learner performance

Graph 2: Total Number of Topics (FET)



- **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



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

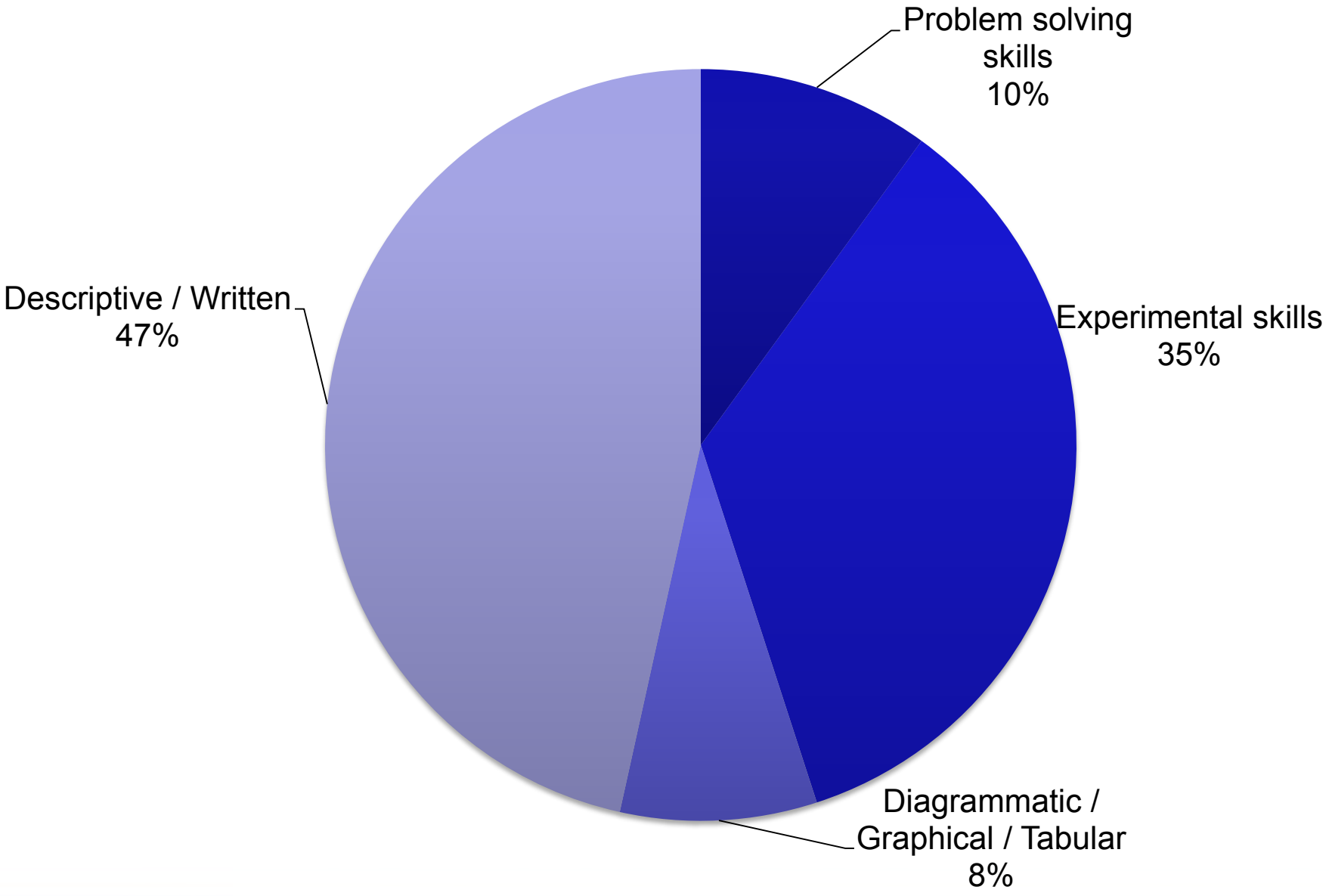
Skills Coverage

- 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

Graph 4: Skills Stipulated in CAPS Teaching Plans



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

Grade 10 Sequencing of Content	
Term number	**Knowledge Area**
Term 1	Matter & Materials
	Waves, Sound & Light
April Vacation	
Term 2	Matter & Materials
	Chemical Change
	Electricity & Magnetism
July Vacation	
Term 3	Chemical Change
	Mechanics
September Vacation	
Term 4	Mechanics
	Chemical Systems

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