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'Learner Centred Learning-by-design Extended Cyberhunts' (LCLBDC):
An Internet Strategy to develop the different cognitive levels

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&

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INTRODUCTION

- A great deal has been written in the South African *White Paper on e-Education* (DoE, 2003, 2004) in terms of the:

    - ❖ type of learning envisioned,

        - ➤ Active learning underpinned by higher order thinking and underpinned by the critical outcomes of the National Curriculum Statement (NCS)

        - ➤ Constructivist principles (Moll, 2002)

    - ❖ kind of Information and Communications Technology (ICT) levels that need to be developed, and

    - ❖ type of school that is required

- HOWEVER: There is a ***paucity of information on how teachers and schools are expected to practically integrate or make use of ICT*** within the South African context (Hodgkinson-Williams, 2005).

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WHAT THE DEPARTMENT OF EDUCATION (DOE) ENVISAGE (Now Department of Basic Education or DBE)

- Schools promoting (DOE, 2003, 2004):
  - ❖ Higher order thinking
  - ❖ Developing critical outcomes:

Identify and solve problems by means of critical and creative thinking [LO1]

Work together in teams [LO2]

Manage themselves responsibly [LO3]

Collect and analyse information [LO4]

Communicate effectively [LO5]

Use science and technology effectively [LO6]

See the world as set of related contexts [LO7]

Employ effective learning strategies [LO8]

INTERNATIONAL CALLS IN LINE WITH THE DOE DEMANDS

- Students [learners] not only seem to have high expectations of how they should learn, **BUChttps** students [learners] also demand that technology should play an integral part in their learning (Conole & Creanor, 2007).

- Learning should become more self-regulated (McLoughlin & Lee, 2010) and learning activities should have at its core (Stubbé & Theunissen, 2008, cited by McLoughlin & Lee, 2010):
  - ❖ Knowledge creation,
  - ❖ Comprehension and
  - ❖ Higher order learning

- To achieve the above, the following is vital:
  - ❖ Self-monitoring,
  - ❖ Learner/Student Reflection,
  - ❖ Leaner/Student questioning and
  - ❖ Learner/Student self-evaluation (McLoughlin & Lee, 2010).

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WHAT DOES THIS REQUIRE?

- Teachers [or lecturers] will have to change their traditional teaching role from:
  - ❖ Delivering pre-packed facts

TO
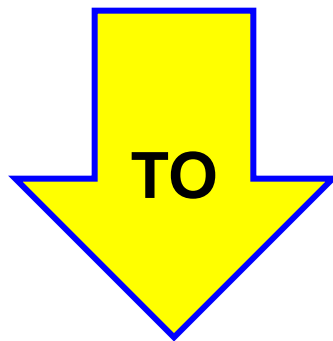
  - ❖ A facilitating role characterised by a social and participatory pedagogy (McLoughlin & Lee, 2010).

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POSSIBLE WAY TO ACHIEVE A PARTICIPATORY PEDAGOGY

- One way to achieve a social/participatory pedagogy is …

  ❖ Learners [Students] *should become the designers of artifacts* which enhance their own learning and which can be used by their peers (Cameron & Gotlieb, 2007; Jonasson, 2000; Harel & Papert, 1991; Kafai & Resnick, 1996; Kimber & Wyatt-Smith, 2006; Perkins, 1986)

  ❖ Technology can assist with the development of …

    ➢ Knowledge dimensions and

    ➢ Cognitive dimensions at the same time (Ainley, Banks & Fleming, 2002)

  ❖ HOW? Technology offers within a *'Designer-of-artifact'* context [treating knowledge as design (Perkins, 1986) …

      ✓ The information resource tools,

      ✓ Authoring tools and

      ✓ Knowledge construction/design tools

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SOUTH AFRICAN PROBLEMS

- Great need on *'HOW'* [*strategies*] teachers and schools are expected to practically integrate or make use of ICT and the Internet within the South African context (Hodgkinson-Williams, 2005).

- Majority of schools are without computers (Howie, Muller & Paterson, 2005; Mlitwa, & Nonyana, 2008) **and …**

- Many of those which do have computers are not connected to the Internet (Department of Education, 2004)

- What happens in the computer room is **not directly linked** to what happens within the classroom.

- Teachers are unsure what to do as they *lack the basic computer and Internet skills*.

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SO WHAT THEN?

- RESULT?
  - ❖ Many learners AND their teachers are '**digital immigrants**' instead of being 'digital natives' (see Prensky, 2001).

- DICOTOMY?
  - ❖ Yet, national curricula demand that children become computer literate and that schools should integrate ICT across the curriculum.
  - ❖ DOE provided a three phase plan [published in 2004] for schools to prepare learners to be digitally competent from 2010 (Department of Education, 2004)

- BUT THE REALITY?
  - ❖ Schools have not been supplied with ICT resources in the Eastern Cape (Du Plessis, 2010)
  - ❖ Rest of South not very different (Howie, Muller & Paterson, 2005)

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THE QUESTION THAT AROSE TO ASSIST WITH ICT INTEGRATION

- Can an Internet learning strategy be developed to assist teachers with Internet integration in the classroom where learners become the designers?

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- By taking the South African context into consideration, the following steps were followed:
  - ❖ Aims or Principles of the proposed strategy were identified and were linked to the critical outcomes
  - ❖ Learning theory or principles were identified that would relate to the aims and critical outcomes
  - ❖ Framework for determining whether the strategy could address the different 'Types of Knowledge' and 'Cognitive Processes of Knowledge' were identified
  - ❖ The 'Sellable' points to teachers/lecturers were investigated
  - ❖ Literature were reviewed to determine what research reports related to 'Learning-as-Design' state

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❖ Develop a *'HOW TO'* process to implement it: Providing *'Step-by-step Phases'*

❖ Determine whether the aspects of the strategy address the different 'Types of Knowledge' and 'Cognitive Processes of Knowledge' by linking the elements to this framework

❖ Develop a website to support teachers or learners as designers, e.g. indicating different cognitive levels and verbs associated with each

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MAIN FOCUS IS …

- Learners should be engaged in thinking on the different cognitive levels (Wilson, 2005):

Knowledge	Comprehension	Application
Analysis	Synthesis	Evaluation & Creation (Design)
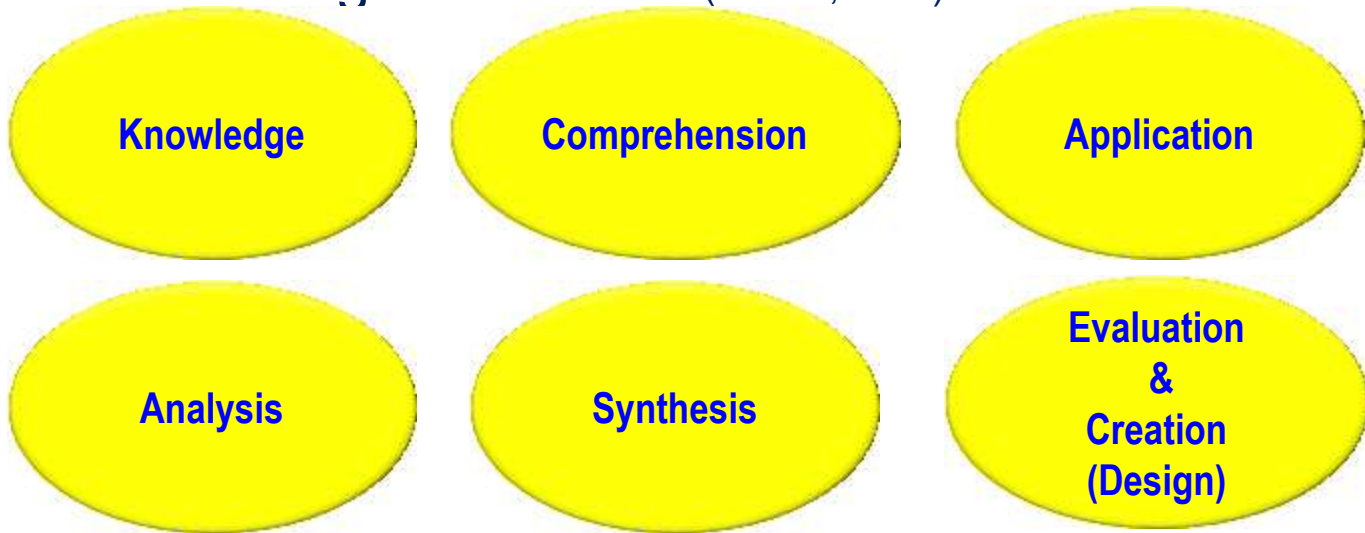
➢ Make learners & teachers aware of the different levels of thinking [Too much focussing on pure 'rote learning' = Level 1]

➢ Create questions on different cognitive levels to be used by their peers

➢ Answer questions on different cognitive levels: i.e. Develop thinking on different cog levels

❖ Identify and solve problems by means of critical and creative thinking [CO1]

❖ Collect and analyse information [CO4]

❖ Employ effective learning strategies [CO8]

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- Learners should become the LCLBDC designers (Learner Centred Learning By Designing Cyberhunts), not the teachers
  - ❖ Use science and technology effectively [CO6]
  - ❖ Employ effective learning strategies [CO8]
- Learners should be able to design the LCLBDC on any given topic from the curriculum
  - ❖ Use science and technology effectively [CO6]
  - ❖ Collect and analyse information [CO4])
- Learners should be taught computer skills and Internet skills
  - ❖ Use science and technology effectively [CO6]
- Learners should be able to collect and analyse appropriate information [literacy skills] linked to the topic provided by the teacher, or even by their peers
  - ❖ Collect and analyse information [CO4]

- Learners should be able to work effectively together in a team to design collaboratively
  - ❖ Manage themselves responsible [CO3]
  - ❖ Communicate effectively [CO5]
- Teachers should be able to implement a learning strategy that can be used by learners for enrichment purposes or by learners who need assistance with a topic in which they lack understanding
  - ❖ Employ effective learning strategies [CO8]
- Teachers who are new to a topic, or who have little knowledge about a topic, should be able to use the strategy to enhance their knowledge and thinking about the topic
  - ❖ Employ effective learning strategies [CO8]
- Teachers and learners should be able to use the strategy to clarify misconceptions about a topic or concepts
  - ❖ Employ effective learning strategies [CO8]

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- The strategy should be able to assist teachers to complete or enrich the curriculum by enabling learners to use the strategy after school to obtain a better picture of the topic
  - ❖ Become responsible citizens [CO9]
  - ❖ Identify and solve problems by means of critical and creative thinking [CO1]
  - ❖ Collect and analyse information [CO4]
  - ❖ Employ effective learning strategies [CO8]
- Learners should be able to develop a memorandum on the questions they have created for
  - ❖ Collect and analyse information [CO4]

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- The ***ONLY** people who significantly benefit from the design process during the design of educational software through the use of design tools are the designers themselves*, **not the learners**

  (Jonassen, Myers & McKillop, 1996).

- Design emphasis *process **and** product*

- *Reflection is a key element* during the learning as design process

- Learning as design is underpinned by *constructivist and constuctionist principles, i.e. learners become the active designers of an artefact*

  - ❖ *Could also subscribe to theory of connectivism when working with learners from other schools over the Internet*

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Matrix of 'Types of Knowledge' and 'Cognitive Processes of Knowledge'

	Types of knowledge			
Cognitive processes	**Factual (Basic information)**	**Conceptual (How basic information connects)**	**Procedural (Ways on how to do something as well as knowledge of the criteria used)**	**Metacognitive (Thinking about one's own thinking or progress)**
Remembering (Recall)				
Understanding (Providing a summary, comparing or classifying something)				
Applying (Applying or carrying out a procedure)				
Analysing (Investigate something)				
Evaluating (Assessing a product, process or something else based on criteria)				
Creating (Producing a product, planning or designing a product or procedure)				

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- **Scenario 1:** Learners or Students struggle with a topic or a section in the curriculum/module
- **Scenario 2:** Looking for enrichment opportunities, i.e. *DEPTH* instead of *BREADTH*
- **Scenario 3:** Not enough time to 'cover' a topic

IN SUM:
Developing the
'Generation of Thinking'
(Hokansen & Hooper, 2000)

IMPLEMENTATION:
Relatively EASY

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RESEARCH ON DESIGN: WHAT SKILLS OR ASPECTS ARE DEVELOPED?

- Project management skills
  - Time management
  - Goal setting
- Research and Literacy skills
  - Sub-skills include reading, skimming, scanning, note taking, defining or creating keywords, validation of the quality of knowledge, online search skills
- Organisation and Representation skills
  - Sequence of presentation
  - Instructions to users
  - Computer skills
- Presentation skills and
  - Computer design skills
- Reflection skills
  - Journal writing on pre-determined questions

    (Lehrer et al., 1992; Lehrer, 1993); Lehrer et al., 1994; Liu, 2003; Eagleton & Dobler, 2007; Watts Taffe & Gwinn, 2007; Du Plessis, 2004, 2010).

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Extending the 7W's of Lamb, Smith & Johnson (1997) to the 12 W's of the LCLBDC

- WHAT ARE THE W's OF THE LCLBDC ?:

Wowing

Wanting

Wondering

Webbing

Wiggling

Weaving

Wrapping-up

Waving, Wmail & Wupload

Wising & Wishing

Any Microsoft Office Software can be used for the LCLBDC

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CLASSROOM IMPLEMENTATION

STAGE 1: WOWING
Teacher: Explanation of Outcomes, Assessment and Results Presentation [Identifying a potential topic that could be useful to explore (decision-making)]

Teacher: Explanation and discussion about any aspects regarding computer related skills

STAGE 2: WANTING
Learners: Planning and Goal Setting in their Journals on pre-defined questions

STAGE 3: WONDERING
- Discussing or Brainstorming possible ideas or topics to explore
- Thinking about possible sub-themes or sub-sections to explore,
- Thinking and defining keywords for their searches

STAGE 4: WEBBING & WREADING:
- Searching for information
- Reading, scanning, skimming
- Bookmarking relevant websites
- Making of notes, if required.

STAGE 5: WIGGLING
- Evaluating the quality of the information found and the appropriateness of the reading level.
- Posing questions to address or to develop the different cognitive levels [MAIN FOCUS of LCLBDC]
- (Learners to receive EXAMPLES of VERBS associated with different cognitive levels!)
  [This is also the most cognitive challenging aspect in the design process]

STAGE 6: WEAVING
- Designing and structuring on the computer [Typing questions and indicating Cognitive levels of question within brackets]
- Inserting of hyperlinks
- Constructing the memorandum and adding or rephrasing any questions, if necessary [MAIN FOCUS of LCLBDC]

STAGE 7: WRAPPING-UP
- Making their design or layout attractive to their users,
- Writing the necessary instructions,
- Testing whether all the hyperlinks are working,
- Ascertaining whether different levels of questions have been appropriately addressed

STAGE 8: WAVING, 'WEMAIL' OR 'WUPLOAD':
- Inviting other learners to use the completed 'learner-designed' artefact
- 'Wemail' to peer/teacher or 'Wupload' to server

STAGE 9 WISHING & WISING:
- Reflecting on the design process with a view to articulate in their journals what to do differently in future.
  What they found easy, difficult, problems experienced,
  Name the skills that they think they have learned
  What they enjoyed
  Whether problems were resolved or not and by whom they were resolved, and
  Any other comments that they may want to make
- Sharing of experiences with rest of class
- Teacher read journals after school: Why?
- Teacher Journal Reflection on the session

HOW THE LCLBDC LINKS TO THE Matrix of 'Types of Knowledge' and 'Cognitive Processes of Knowledge'

Cognitive processes	Types of Knowledge			
	Factual (Basic information)	**Conceptual (How basic information connects)**	**Procedural (Ways on how to do something as well as knowledge of the criteria used)**	**Metacognitive (Thinking about one's own thinking or progress)**
Remembering (Recall)	Learners provide answers to lower level questions in he Cyberhunt	Learners provide answers to questions in the Cyberhunt	**When Designing:** • Identify keywords • Searching for info • Reading, scanning, skimming • Bookmarking relevant websites • Making of notes, if required • Evaluating the quality of the information found and the appropriateness of the reading level. • Posing questions to address or to develop the different cognitive levels • Inserting of hyperlinks • Constructing the memorandum	
Understanding (Providing a summary, comparing or classifying something)		Learners provide answers to questions in the Cyberhunt		
Applying (Applying or carrying out a procedure)	Learners using other learners' created Cyberhunts	Learners provide answers to questions in the Cyberhunt		
Analysing (Investigate something)		Learners provide answers to questions in the Cyberhunt		**Reflection:** Completing journals to reflect on what they have learned (skills, knowledge, procedures, etc.)
Evaluating (Assessing a product, process or something else based on criteria)	Learners assess other learners' answers or presentations	Learners assess other learners' answers or presentations	**When Assessing:** Learners assess quality of the learner designed Cyberhunt based upon a checklist/rubric OR assess answers	**Reflection:** Completing journals to reflect on their own progress based upon evaluation issues such as e.g. which goals have you reached? Which goals were not reached? Explain.
Creating (Producing a product, planning or designing a product or procedure)	Learners create their own Cyberhunts in a group or as individuals			Learners reflect in their journals on how well they have designed it and what changes they should make next time

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WEBSITE FOR FUTURE USERS: ASSIST WITH EXAMPLES

- www.nmmu.ac.za/cyberhunts/index.htm

- Example of a cyberhunt created in PowerPoint
- Problem = Cognitive Levels addressed not indicated
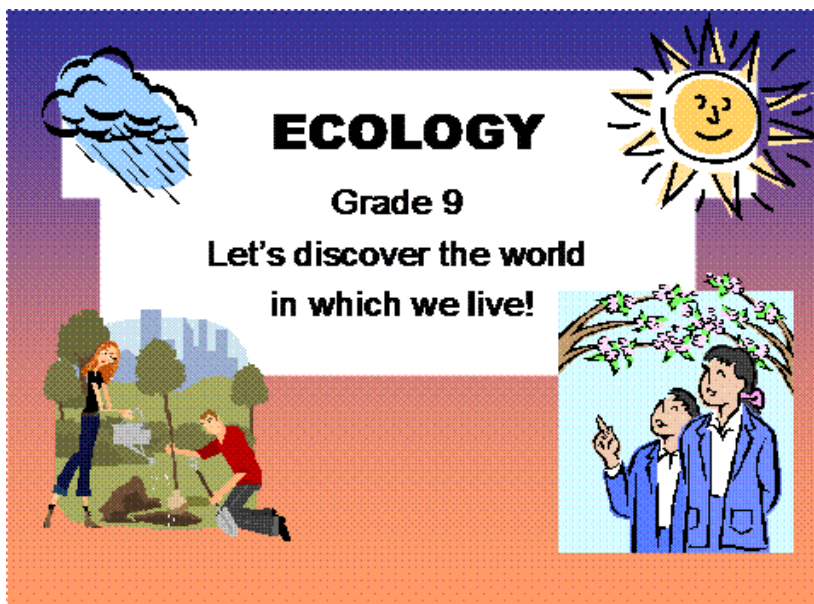
▪ Problem = Cognitive Levels addressed not indicated

Cyberhunt

The Phases of Matter

Grade: 10 Physical Science
Ms N. Wood

When is a gas called a vapour?

http://en.wikibooks.org/wiki/General_Chemistry/Properties_of_Matter/Basic_Properties_of_Matter

SKAV: K

Describe the arrangement of molecules in solid state matter.

http://www.chem4kids.com/files/matter_solid.html

SKAV: K

Comment on the use of gas as an alternative source of power.

http://www.global-greenhouse-warming.com/gas-vs-coal.html

SKAV: AV

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- Designed in Microsoft Word &
- Cognitive Levels addressed indicated

A VISIT TO ADDO ELEPHANT PARK

Answer the questions on your printed worksheets. Click on the blue links to go to a website which has the information you need to answer the questions listed below it.

What to see and do in Addo
http://www.nature-reserve.co.za/cape-eastern-addo-elephant-park.html

1.   (Know) How many elephants are there in the Addo Elephant Park?

2.   (Know) How far away from Port Elizabeth is the Addo Elephant Park?

3.   (Know) Name three other kinds of large animals you could expect to see in Addo.

4.   (Comp) What is another name for a suricate? Describe one in a sentence.

5.   (Comp) What do you think is the main thing visitors to Addo, do?

6.   (Comp) What other activities are there? (Name at least 3).

Accommodation at Addo   http://www.sanparks.org/parks/addo/

7.   (Know) What are the main types of different accommodation at Addo? Name at least five types.

8.   (Appl) How many safari tents are available for the night of 1 September 2006?

9.   (Know) How many people can sleep in each tent?

10.   (Comp) Describe a safari tent in your own words (Hint: find some pictures).

11.   (Appl) How much would it cost for a family of 2 adults and 2 children to share a Forest Cabin on the night of 1 September 2008?

12.   (Comp) Which number would you phone to book your reservation?

'Learner Centred Learning-by-design Extended Cyberhunts' (LCLBDC) AS <u>A</u> STRATEGY TO ADDRESS THE CRITICAL OUTCOMES

- Cyberhunts as a strategy is ___ONE___ strategy to address the critical outcomes AND ___NOT the ONLY___ strategy

AND AFTER THE 'Learner Centred Learning-by-design Extended Cyberhunts' (LCLBDC)?

- We suggest learner created WIKI's based on the same principles as the LCLBDC
  - ❖ Collaborative in nature, i.e. whole class can participate simultaneously

END

- Thanks for attending
- Any questions or remarks?

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