

# Soft-boundary or re-crystallised learning objects: A new model for knowledge society development

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## **Abstract**

Currently, known learning objects are digital with the basic features of being reusable; self-contained; can be grouped into larger collections of content, and can also be meta-tagged for easy search. This paper attempts to extend the methodology behind the design of learning objects to a new class of learning contents termed **Soft-Boundary Learning Objects (SBLOs)** or **Re-Crystallised Learning Objects (RCLOs)**. These are learning materials evolved from the **soft areas** of some core knowledge areas designed to educate people in various aspects of common knowledge or vocational skills acquisition. From an epistemological angle, SBLOs are to serve as materials extending the users' knowledge beyond specialised expertise and having the merits of being re-packaged into effective tools for many purposes.

The term **re-crystallised** is borrowed from re-crystallisation process within the **boundary** region of the **hard** lithospheric and **soft** asthenospheric regions of the earth's geophysical mass. This region is called the **Moho Discontinuity** and thus the concept of SBLOs as an optimisation strategy, is to minimise **Learning Discontinuities** existing between specialist areas and basic knowledge. The paper presents an algorithm for the design of SBLOs and cites exemplars of RCLOs with recommendation for further studies on this class of learning objects towards development of unified standards for their designs.

## **1. INTRODUCTION**

It is of utmost importance to remind ourselves that knowledge is the vehicle for human society development. Though the impacts of information and technology revolution are very ubiquitous, however, knowledge societies remain sparsely distributed across the world, especially in the developing countries. While there are varied causes for the global disparities of knowledge capacity, this paper aims at focusing on proposing a specialised solution strategy or methodology for the obvious educational challenge that most useful knowledge areas still remain within **expertise domains**. Permit me to call such domains **litho-cognitive** domains (from Greek **lithos** = stone). Knowledge in such hard domains needs to be re-crystallised for expanded human utilisation and development.

The thesis of this paper builds on the scenic illustration characterising the tectonic process of re-crystallisation that occurs within the **subduction zone** (where the lithospheric plate (hard upper layer of the geomass) dips into the asthenosphere (the softer region or the earth's mantle). Definitely, this is a special case of a more generalised phenomenon typifying the existence of a soft-boundary between a highly dense material sub-region and its immediate soft or low-density boundary sub-region. Now, applying this contextually, many hard knowledge areas need to be **subducted** into the human society and re-crystallised for knowledge society revolution. Moreover, as an **Optimisation Strategy**, RCLOs are here proposed to be designed for minimising **Learning Discontinuities** existing between specialist areas and common useful knowledge.

Basic theoretical strategy underlying the construction of on-demand RCLOs explores the following key areas:

- Dimensions of Softness
- Development Strategies
- Deployment Spectrum

## 2. DIMENSIONS OF SOFTNESS

Hereunder, RCLOs are proposed as 7-Dimensional learning objects, while extended dimensionality is open for further studies.

### (i) Objectivity Dimension

RCLOs or SBLOs are defined as critically objective-focused learning objects. Specifically, in the context of society or human development, RCLOs should be developed with behavioural changes or skills development as their tangible learning outcomes. These objectives, though at higher cognitive levels as they may appear, would characterise RCLOs as special classes of learning objects.

### (ii) Problem-Solving Dimension

Knowledge is at its best when it can be applied to problem-solving. This is the learner-centricity feature of RCLOs, making them effective distance learning materials. Adequate and relevant knowledge provides cheaper solutions to many of human problems.

### (iii) Best Practice Dimension

Closely related to (ii) above, RCLOs should be endowed with relevant case studies. Thus, RCLOs should be devoid of superfluous and generalised learning concepts. This equally defines the ♦High Relevancy♦ of RCLOs.

### (iv) Soft Theory (or Low Threshold) Dimension

RCLOs should be ♦theoretically soft♦. This is also called ♦Low Threshold♦ dimension. Employing the meaning of the terminology, ♦threshold♦ as ♦how difficult it is to learn how to use a system♦ (Myers, Hudson and Pausch, 2000) and as applied by (Canas, A. J. et al, 2004) in ♦CMAPTOOLS: A Knowledge Modelling and sharing Environment♦, we propose that RCLOs should be of ♦low threshold♦. This specifically distinguishes the softness of RCLOs.

### (v) Modular (Architectural) Dimension

RCLOs are to be developed on modular architecture platforms, in the sense that specific components can be removed or replaced according to contextual variations (e.g. as in cultural adaptation)

### (vi) Learning Object Inheritance (LOI) or Adaptability Dimension

RCLOs should inherit all basic conceptual features of common learning objects. This can also be termed ♦adaptability♦ dimension.

### (vii) Portability Dimension

Portability is here defined in the sense of cultural settings. A multi-culturally portable RCLO should be of higher educational worth than a mono-cultural RCLO. Thus adaptability dimension is a generalisation of portability dimension, in this sense.

## 3. DEVELOPMENT STRATEGIES

Here, we present the ♦3 RCs♦ of development strategies for RCLOs, namely,

- i. Relevance of Content
- ii. Resource Chain

iii. Review Cycle

**(i) Relevance of Content**

Below in Figure 1, is a chart to illustrate the concept of RCLOs or SBLOs. Re-crystallisation for some knowledge areas might need to go through a number of stages before it becomes ♦relevant♦ as a RCLO. Thus, there can be ♦multi-stage\_re-crystallisations♦ before a measure of relevancy is achieved based on selection of appropriate Relevance Variables (RV). It is in order to also remark that some core knowledge instructional materials may be non-re-crystallisable, taking into consideration a number of dimensions proposed above.

**See** Figure 1: Re-Crystallisation Strategy and Process

As illustrated in Figure 1, we provide a simple pseudo-language variant as follows:

```
SELECT Core Knowledge Area (CKA)
IDENTIFY Expert Knowledge Level (EKL)
    SELECT Relevance Variable (RV1), RV2♦RVn)
        IF FOUND, Determine Content Type
        OTHERWISE, Perform a new RV Selection
    PERFORM TAV Search for content
        SELECT Create (CR) or Adapt (AD)
        IDENTIFY Expert for CR or AD
        SUBJECT CR/AD to Learning Object development standards
PACKAGE (or evolve) RCLO
IDENTIFY deployment outlets
OBTAIN Feedback
REVIEW for further use
RE-DEPLOY
```

**(ii) Resource Chain**

Examples of CKAs<sub>are</sub> Health, Technology, Commerce, Sociology, Finance, Education, Law, etc, while examples of RVs are Literacy Skills, Hazards Prevention, Vocational Skills, Awareness Items, Teaching Styles, Leadership Styles, etc.

Resource Chain within the development strategies comprises selection of content, after the selection of an appropriate Relevance Variable (RV). This also includes selection of human expert to either adapt or create relevant RCLO. Expertise at this stage could include a Media expert, who needs to `soften' or `re-crystallise' a material for final packaging of the RCLO subject to some objective-oriented and instructional design standards. Specifically, for example, if our CKA is Health, an Expert Knowledge Level (EKL) could be human health or veterinary medicine. Another EKL can originate from either of these two; for example within human health, we have pediatrics, ophthalmology, etc. Then further within pediatrics, relevant RCLOs could be developed for mothers and child care organisations, aimed at preventing common diseases leading to high children mortality rate around the world.

**(iii) Review Cycle**

This definitely becomes operational after selection of the deployment outlet. However, framework for the Review Cycle should be part of the development strategy.

#### **4. DEPLOYMENT SPECTRUM**

Conceptually, RCLOs are not primarily proposed to be designed for structured learning systems as in certification programmes. Hence the need to identify the deployment or usability scope of the Re-Crystallised Learning Objects. What are the deployment avenues for RCLOs or SBLOs?. The SBLOs are meant for the following:

- i. Knowledge experts who aim at becoming basically literate in other knowledge areas outside their expertise domains.
- ii. Awareness training programmes such as on prevention or management of health related problems.
- iii. Simple but effective procedures for Care management (e.g. in Old People's homes, Physically Challenged People Centres, Orphanages, etc.)
- iv. Home School Management (e.g. basic child psychology and teaching technique lessons for parents, etc).
- v. Social Welfare Initiatives
- vi. Workplace and professional ethics (e.g. acceptable practices and code of conduct).
- vii. Basic multi-cultural and multi-lingual practices.
- viii. Basic human rights and citizenship standards.
- ix. Human security and safety.
- x. Environmental protection issues.
- xi. Vocational skills acquisition.
- xii. Simple health management.
- xiii. Family care practices.
- xiv. ♦ and others.

Definitely, the above exemplars and many others can be classified under core areas of knowledge from which relevant RCLOs can be developed for deployment on any of the following user platforms:

- Personalised instruction or learning.
- Orientation programmes.
- Government mobilisation and awareness activities.
- Non-Government Organisation (NGO) support initiatives.
- Institutional short course programmes.
- Local community development initiatives.
- Youth development programmes
- ♦ etc.

#### **5. CONCLUSION**

Though there are so many knowledge resources available, especially on the web today, however, that there are equally yet many people who are non-literate in so many areas outside their expertise domains, remain evident. The age of web literacy for example has not effectively transmitted into literacy in many other areas of human knowledge. Thus taking optimum advantage of information and knowledge revolution demands orientation towards multi-learning opportunities available in today's world.

While business, leisure and financial benefits seem to be the dominating motivation behind most users of information resources, such motives compete with other positive human development potentials of the web.

Learning objects have added a new dimension to the instructional and learning resources in recent times. While many of these digital learning materials are rich in content and appear in varied formats (text, video, simulation), classified under core knowledge areas, most of the materials still inherit very high measure of ♦hardness♦.

It is worth mentioning that while the paper aims at focusing on the positive benefits of RCLOs for knowledge society development, however, it should be admitted that there are many aspects of some core knowledge areas that may not be re-crystallisable! (as in some core areas of Science and Engineering). Hence the design strategy identifies the need to identify ♦relevance♦ as a major construction step. Re-crystallisable contents exist in many core knowledge areas (CKAs) such as Law, Agriculture, Medicine/Health, Accounting, Technology, Linguistics, Sociology, etc. A number of areas highlighted in section 4 above can be classified under some of these CKAs. In RCLOs, technical terminologies could be replaced with descriptive phraseologies as a softening methodology. A good example of learning objects that could pass for an RCLO is found in ♦Math in Daily Life♦ ([www.learner.org](http://www.learner.org)) as listed in the references. A collection of such simple relevant learning objects would model the soft-boundary knowledge materials whose design strategy is the thesis of this paper.

As part of meaningful efforts towards meeting the Millennium Development Goals (MDGs), knowledge experts and educators have the task of making knowledge more accessible to the human society. An aspect of such accessibility is to soften most knowledge areas and make them relevant for human development. This is the basis for Re-Crystallised Learning Object (RCLO) methodology. Having highlighted the main features of RCLOs, the need therefore arises for further studies on such areas as, for example;

- identifying non-re-crystallisable knowledge contents;
- identifying more possible dimensions of softness;
- exemplifying characteristic features of RCLOs not necessarily peculiar to common learning objects, and
- other relevant design and development issues.

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Re-Crystallisation Strategy and Process



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