

**SYSTEMIC APPROACH TO TEACHING  
AND LEARNING CHEMISTRY (SATLC) IN EGYPT  
(1998-2011)**

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**ABSTRACT**

The rapid changes and increased complexity of today's world present new global challenges on our education systems. The SATL contribution to education reform was dictated by the globalization of most human activities; the future of science education must reflect a flexibility to adapt to rapidly changing global needs. Fahmy and Lagowski since (1998) have designed, implemented, and evaluated the systemic approach to teaching and learning chemistry. Our aims have always been helping teachers to teach and students to learn more effectively by using SATLC. [*AJCE, 2(2), February 2012*]

## **INTRODUCTION**

By "**systemic**" we mean an arrangement of concepts or issues through interacting systems in which all relationships between concepts and issues are made clear, up front, to the learner.

**SATL** is a new way of teaching and learning, based on the idea that nowadays anything is related to everything globally. Students shouldn't learn isolated facts (by heart), but connect concepts and facts in a logical context.

The use of systemics can help students begin to understand interrelationships of concepts in a greater context, a point of view, once achieved, that ultimately should prove beneficial to the future citizens of a world that is becoming increasingly globalized. We have conducted numerous experiments in which we attempted to establish the effectiveness of SATL methods not only in chemistry, but also in other basic sciences, medicinal sciences, engineering sciences, and Agriculture sciences. In chemistry, we have conducted a series of successful SATL-oriented experiments, at secondary and tertiary levels of education in Egypt.

## **WHY SYSTEMIC APPROACH**

It verifies the major goals of educational system and proceeds towards systemic thinking and continuous growth of knowledge that is referred to as quality of education.

It represents a theme and method of teaching and learning beside its way of life that can be utilized in the management of various sides and activities of a normal citizen in all the scientific, and technological aspects.

The challenges that face the world today such as terrorism, environmental pollution...etc. that requires preparation of human calibers to be able to systemic and creative thinking that stops such phenomena for the sake of a better world for all.

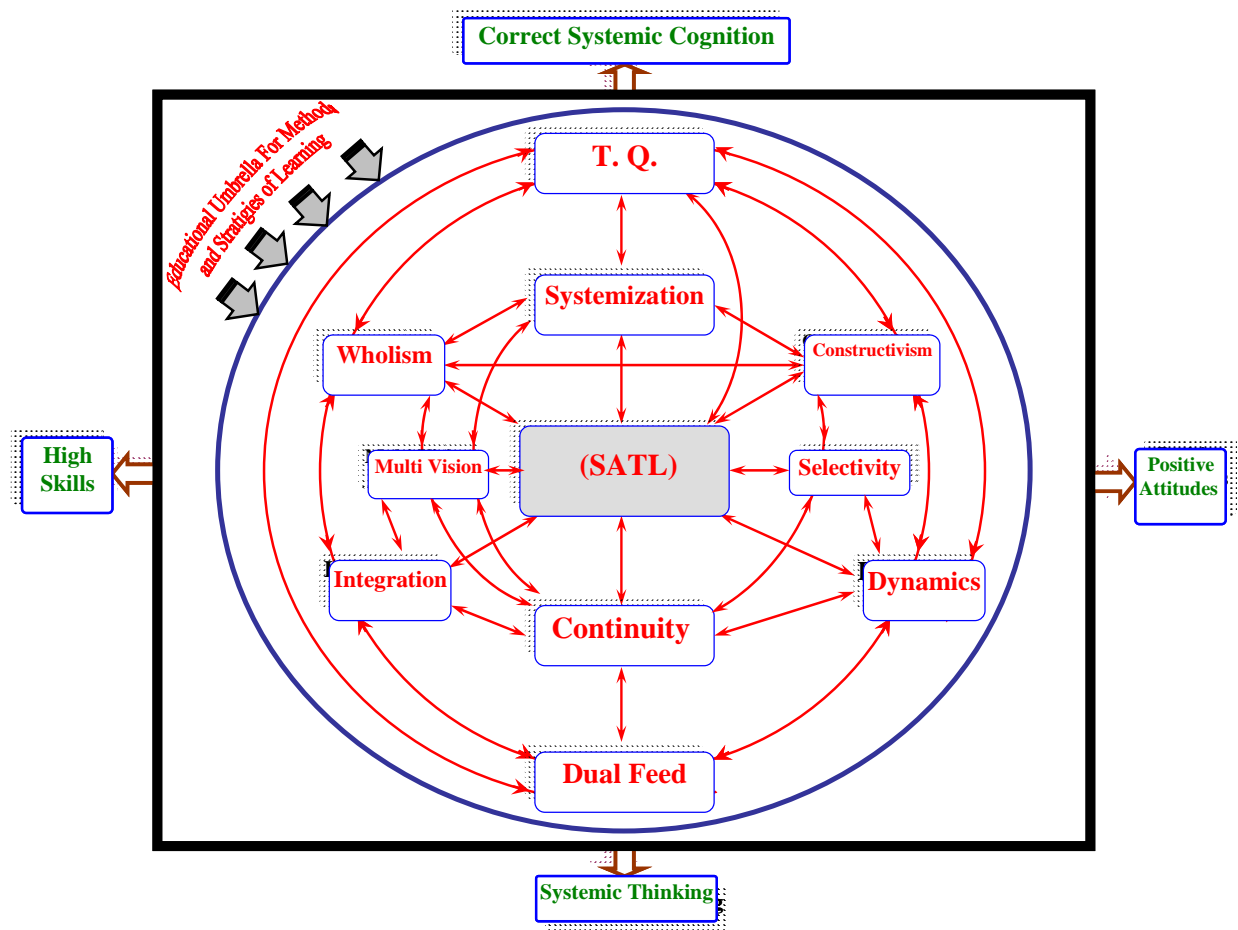
**☐ Challenges that face the individuals in their home nations compared to what happens in the world such as:**

- Mechanization of many local and international activities that require higher skills.
- Procuring of many institutions and companies on the ISO (Total Quality Certificate).
- Application of high tech. locally and internationally which requires a revision of many programs for preparing and training in order to cope with such technologies.

**☐ Theoretical bases on which the systemic approach stands on:**

**SATL** stands on the wholistic vision for phenomena where linking different facts and concepts take place into a dynamic systemic network. This reflects the relationships which settles them into the cognitive construction of the learner and enables him to use it by a systemic way in different situations.

It also helps learner to deduce new relations that enrich the operation of teaching and learning from its cognitive, psychomotor and emotional sides. SATL was based on the systems analysis and theory of constructivism. The following diagram illustrates the criteria, and products of learning by SATL.



□ **Application of SATL:**

SATL was applied in the fields of Basic, Environmental, Agricultural, Engineering, Medicinal, and Linguistics...Sciences, in secondary and tertiary Education.

The statistical analysis of student achievement results shows that the students engaged with SATL materials and taught by teachers trained in systemics achieve at significantly higher levels than those taught by the standard linear methods.

□ **In Chemistry (SATLC):**

- **University level:** There are four courses (SATL-Aliphatic Chemistry, SATL-Aromatic Chemistry, SATL-Heterocyclic Chemistry), and Green chemistry in lab experiments, for

Faculty of Science-students. These courses were successfully experimented, and applied now in different Egyptian Universities.

- **Pre-University level:** General chemistry course was prepared and tested.  
e.g.: systemic periodic table, systemic chemical bonding,
- **Systemic Objective Tests (SOT):** were produced and experimented successfully in Egypt, e.g. systemic multiple choice Questions (SMCQs), Systemic True False Questions (STFQs), and Systemic Matching Questions (SMQ, s) in Chemistry.
- **Recently for IYC 2011;** we Use SATLC & Multiple intelligences [MI] in designing outdoor activities in Chemistry for tertiary level "Chemistry Gets Easier Initiative, CGEI".
- **Postgraduate Studies on SATL:** About 50 PhD and Maser students work on SATL in Egyptian and Arab universities; about 30 of them got their degrees.

#### □ **Workshops and Conferences on SATLC:**

- Two international workshops on SATLC were organized:  
One satellite to the third Arab Conference on SATL, Cairo, April, 2003, the other was in the 18<sup>th</sup> ICCE, Istanbul, and Aug. (2004).  
-10-Days Workshop on SATLC [PS-SATLC] was held at Karachi University, Pakistan (19-29, Nov.2008).
- **Conferences & Symposia and Seminars on SATLC:**
  - Six Arab conferences on (SATL) were held annually at Cairo, (2001-2006).
  - Two Jordanian- Egyptian conferences were held annually at Jordan (2005, 2006).
  - One symposium on (SATL) satellite to 20<sup>th</sup> ICCE was held at Mauritius (Aug.2009).

- About 60 seminars were organized on systemic Approach, and Systemic Assessment in Egypt, Libya, Syria, Algeria, Jordan and Pakistan.

☐ **Training Programs on SATL:** More than 50.000 teachers were trained in Egypt on SATL part of them are chemistry teachers.

☐ **See Also**

- Fahmy, A. F. M.; Lagowski, J. J.,(2002) *Systemic Approach to Teaching and Learning Chemistry: SATLC in Egypt*, Chemical Education International, Vol. 3, No. 1,.
- Fahmy, A. F. M.; Lagowski, J. J.,(2003) *Systemic Reform in Chemical Educations: An International Perspective*. J. Chem. Educ, 80, 1078-1083.
- Lagowski, J. J.,(2005) *Systemic Approach to Teaching and Learning*, J. Chem.Educ., 82, 211.
- Fahmy, A.F.M., Lagowski, J.J.,(2011) The systemic approach to teaching and learning (SATL): A 10-year review, AJCE. 1, (1),29-47.