Science dropout and remedial measures.

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Abstract*: Evaluation of P.I.S.A-2009 shows an average result within the Collége (equivalent to lower secondary levels of O.E.C.D) students of France, but in 2000 E.U seminar 16 quality indicators were identified in which up gradation of science study was one of the major issue of intervention selected by pedagogic. In this study we tried to discriminate the reasons, why the inconsistency in science learning is growing. In this comparative study we tried to analyze firstly the scientific assessment graph of P.I.S.A-2009 in contrast to 2006 in France along with few developed countries. Afterwards we measured the study hours and facility provided by the educational concern from C.E-2 to 2nd. From this study we concluded the concept that due to unavailability and scope of proper guidance if a student become deviated from science stream then it might be call 'science drop out' which certainly happens every academic year at least within few students who are entering in lycées (higher secondary section) after completing their Collége –study. This practice not only creates a bad effect to the individual but also to the economic growth and scientific infrastructural development of the country.*
Keywords*: P.I.S.A, French Collége, O.E.C.D, 16-quality indicator, C.E-2 to 2nd.*

I.   Introduction.

From TIMSS-1995 to P.I.S.A-2009 assessments, the French college student's (secondary level of O.E.C.D countries) performance in science subject has not reached the average mark of the assessment. On the contrary French students have done better in all mathematical assessments (except in 2009 which showed an average result). From "le projet académique de l'académie de Nice -2010-12", it was found that 11% students are recognized as having dropped out or are constrained to leave their conventional studies before their entrance in university level, which is inconsistent with the goal of making Europe 'the most competitive and dynamic knowledge-based economy in the world' provided by the European union's meeting in Lisbon in 2000. In spite of measures for the prevention of school dropout taken (Bulletin officiel n°23 of 4th June, 2009) by the education department dropout is increasing. We are all aware of the fact that, in the curriculum of elementary and secondary education, science, mathematics and technology should get priority in a country to make it more advanced and developed. Now the question arises to know if the students in elementary and secondary education are evaluated, motivated and mobilized properly. Maryse Esterle, a researcher of E.U.K.N, commented that the causes of school dropout are multifactorial (problems at school, with family, peers, etc.) but that the most important factor is undoubtly the accumulated deficiency of learning since at the beginning of the scholastic career. Inconsistency in science subject in elementary and college level might tender a student as 'science dropout' which might not be counted but as serious as general dropout.

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II. Science assessment results.

In TIMSS[1] assessment (1995) French students got a respectable position in mathematics and ranked 13th within 40 countries, well ahead of Germany (23), England (25) and U.S.A (28),but in science, French students ranked 28th, behind England (10),U.S.A (17) and Germany (19). From P.I.S.A[2]- 2006and 2009 survey, we can make a comparative analysis about the status of science results within few states of developed countries. The following graph has been made by consulting the statistical report of P.I.S.A-2006 & P.I.S.A-2009.

II.1. Explanation of the graph

P.I.S.A-2006, a comparative graphic representation in science assessment
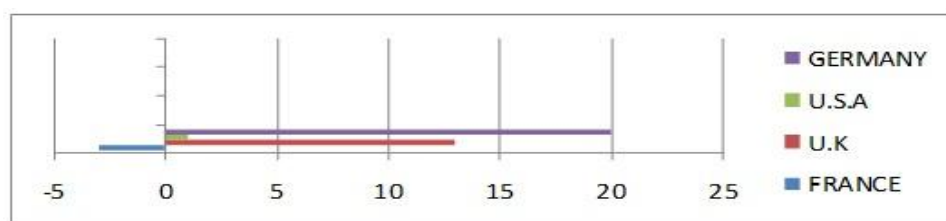
P.I.S.A -2009, a graphic representation and comparison with 2006

The o indicating point of graph represents the average results (501point out of 700) of O.E.C.D countries. The two above graphs (contrast between the performance of 2006 & 2009 clearly indicate that the status in the field of scientific studies in 15-aged students of school levels within four of the most developed countries of the world are as follows-

- U.S.A: Have made a comprehensive development of 13 points. In 2006, U.S.A scored 489 which was much below the O.E.C.D average level (500).In 2009, they are just over the O.E.C.D level (501), getting 502 points.
- Germany: Was well advanced over the O.E.C.D average achieved 516 in 2006 and made own position better in 2009 getting 520 points.
- France: Lead in 3 points in 2009 compared to 2006. Still remains lower than the average scale of O.E.C.D. Scored 495 & 498 in two consecutive P.I.S.A test.
- U.K: Only deviation of one points, scored 515 in 2006, lower down in 514 in 2009.

From the above analysis one can perceive about the developments in scientific studies within the lower secondary school students.

III. Weekly study hours of science subjects in French curriculum

Here we shall discuss how many study hours have been allotted for a student in a week for science and technology studies, (starting from C.E-2 to 2nd of lycée).

In the cycle of elementary study (CE -2 to CM-2, 8 to 10 age group) there are 8- hours assignments in French language where as 5 hours & 2.5 hrs has been allotted for mathematics and science per week. In French college[3] we found the following distributions of scientific study hours.

In sixiéme (11-12 age), 3 hours have been allotted for science and technology where 5-hours and 4- hours has been allotted for French language and mathematics.

In Cinqueime (12-13 age) & Quatriéme (13-14 age), 4.5- hours have been allotted in per week in science and technology compared to 4- hours for French and 3.5- hours for mathematics.

In Troisieme (14-15 age), 5 hours (3hours in science & technology and 2- hours in physics and chemistry) have been allotted for S&T where 4- hours are allotted to each French and mathematics class respectively. In 2nd of

In lycée (16-17 age),there are 5.5- hours assignments in scientific curriculum (3.5 for physics/chemistry &2hours for science) in compared to 4.5 and 4 hours allotments in French language and mathematics.

III.1. Comparison of weekly study hours in French language, mathematics and science
Following chart is representing about the proportion of three subjects in different level of studies.
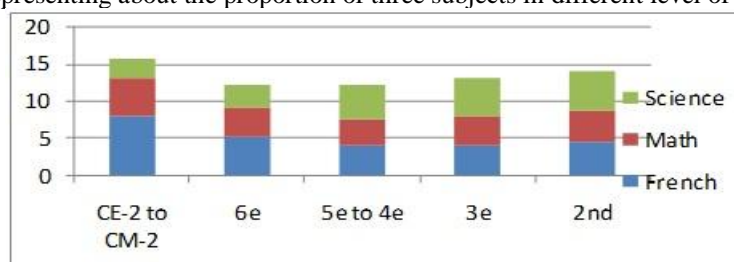
III.2. Scientific study hour coverage in different levels of curriculum.

- Elementary level (CE-2 to CM-2)-   10.4%
- Adaptation cycle (6e)-   12%
- Central cycle ---------(5e)-   19.6%
- Central cycle-----------(4e)-   17.3%
- Oriental cycle(3e)   14.5%
- 2nd in lycée -   16.1%

From the above chart we found that in elementary and 6e curriculum science subject has been provided little less importance than other grades (from 5e to 2nd).

IV.   Some major issues which obstacle in quality scientific studies

(A) Quality of teaching: In a science class, teacher should often take the experimental process to explain a new scientific problem to the students and make it clear that all the extraordinary complexity of nature can be described by some universal laws, proper utilization of technical and chemical products which they use in daily life and sufficient knowledge about the physical structure and activity of his own body. Quality of teaching should be upraising with special training in science category.

 (B) Self perception: We shall represent the survey report of TIMSS-1995, which was made within the final year of secondary education about the self perception of the students that they achieve from scientific studies. Survey report shows only 50% answered strongly positive of French students which are lower than U.S.A (87%), Austrelia (73%) and Canada (77%). The first and foremost duty of the teacher should to create 'self-perception within students otherwise all the teaching process will go useless.

(C)Proficiency level: According P.I.S.A assessment-2006 shows the percentage of students occupied in the grade level-1 or below are 21.1%in France in scientific studies which is behind in compare to Germany (15.4) & U.K(16.7) but ahead of U.S.A (24.4%).

(D) Gender difference: In the field of science performance of P.I.S.A -2009, boys are ahead of girls in the countries like France, Germany, and U.K & U.S.A but in Finland, New-Zealand and Poland girls are ahead of boys.

(E) Science in the evaluation system: In French education system assessments of science should be included in standardize test in C.M-1, C.M-2,6e and in 2nd. Also there is no science test in main 'BREVET' examination.

V.   Suggestions for implementation:

 To bring the necessary change in the science curriculum: At the initiation stage of elementary education some science culture should be adapted for the betterment of students.

- In hard science class there should be the scope for teachers and students for free discussion about the influence of science in our daily life.

N.B: determination of chemical or organic nature of something in Chemistry and transformations of power from heat and to light and vice-versa with examples.

- One can realized from the above graph that from 5e to 2nd the weakly assignments of hours in science are sufficient compared to mathematics and French languages but in elementary level science classes should increase an hour (2.5 to3.5), decreasing French language class (8 hours to 7 hours).
- Division of physics and chemistry should one year earlier in curriculum (i.e: instead of 3e it should be commenced at the beginning of 4e).
- There should be short course training for science teachers (traditional teachers training cannot fulfill the requirements of science teaching) in college level and especially for the teachers of elementary stage.

N.B: Teachers of elementary level are specially trained in 'Switzerland' and 'Italy'.

- In all standardize tests and in 'BREVET' written examination, science should be included with importance.

- To encourage students in scientific studies 'science core group' can be formed with selected students and parents in elementary level and college who will organize 'science summer camp' in vacation with 'simple experimental projects' to acquainted students with the fact that how the simple experiment based project can explain the problems of our daily life.
- Those 'core science group' will publish 'science wall magazine', from the best written collection of the students in every certain intervals.

VI.   Conclusion.

In order to face the challenges of educational reforms, policy-making often relies on profound research into the areas in question. Research seeks to establish causes and effects or at least co relational relationship between educational policies, pedagogical methods and learning outcomes and, again, to link educational development with wider socio-cultural, economic and political development and change. The causes of school dropout are multifactorial (problems at school, with family, peers, etc.) but one of the important factors is undoubtly the accumulated deficiency of learning sciences at the beginning of the scholastic career. In this way students loose their self-esteem[5]. Due to the inefficiency of their learning, people aged 18-24 are to struggle much in their professional career. Manipulation in counseling and enhancement in science studies from the beginning of elementary education could prevent many students from avoiding the science stream and might be a successful intervention against science dropout.

In the conference of UNESCO in Rio-de-Janeiro, 3 billion costs were estimated for the implementation of science for sustainable purposes. Policy makers measured that science and technology need to develop tools for sustainable development for the quality of living standard of human being, so that since the very beginning of their school living, students could built a positive approach to science world.

VII.   Acknowledgements.

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