CHAPTER - X

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Explosion in the field of technology elsewhere in the world has affected Indian society also. The problem with the educationist throughout the world is how to educate for change without loss of inner stability and integrity. Hence the need to develop the full capacity of body and mind and to orient the individual towards the issues of a changing society rather than to emphasize quantitative acquisition of specific content. The revolution in the field of science has made it imperative to devote special attention to the study of science.

Advances in psychological research, improved technique of teaching, curriculum development and evaluation are some of the significant factors which have contributed to the revision of curriculum design and modes of teaching science. A review of history of curriculum development in the present century shows that it is the child-centred curriculum, according to needs of the scientific society, which is most emphasized. The statements
about goals and values have consistently reflected the prevailing philosophy of every time.

The choice of developing objective-based curriculum and to find its efficacy in science achievement and in developing process skills among high school science students had special appeal primarily, because very few studies have been conducted by taking instructional objectives expressed in behavioral form as the basis for developing curriculum. So far, many studies have been conducted concerning curriculum, methods and textbooks and most of the studies have tried to analyze or examine the curricular trend or historical development of curriculum at different stages and in different periods and areas of the country. Again there are hardly any studies which relate the objectives, skills, intelligence and other personality traits; so the objectives of present study were to find,

- whether objective-based curriculum is superior to conventional curriculum of science at high school level in terms of achievement?

- whether intelligence contribute significantly to achievement or not?

- whether objective-based curriculum is superior to conventional curriculum of science at high school level in the terms of acquisition of process skills among high school science students?
whether intelligence contribute significantly to the acquisition of process skills among high school science students?

whether personality type (extroversion and introversion) contribute significantly to the acquisition of process skills among high school science students?

whether there is significant interaction between types of curriculum and intelligence on achievement and acquisition of process skills?

whether intelligence interact with personality or not?

whether personality of the learner interacts with modes of curriculum or not?

whether there is significant interaction between learner's characteristics (personality and intelligence) and designs of curriculum?

The study was advanced on the basis of hypotheses given below:

(1) Objective-based curriculum is significantly more effective than the conventional curriculum of science in respect of science achievement (knowledge, comprehension, application) at high school level, irrespective of intelligence and personality traits.
(ii) Significant differences exist in terms of achievement irrespective of curriculum design and personality traits among high school science students with differential intelligence.

(iii) Personality traits (Extroversion and Introversion) do not significantly effect the achievement of high school science students.

(iv)(a) There is no significant interaction effect of curriculum and intelligence on science achievement.

(b) There is no significant effect on science achievement due to interactional effect of curriculum and personality.

(c) Interactional effect of curriculum and personality do not effect significantly science achievement.

(d) There is no significant interactional effect of curriculum, intelligence and personality.

(v) Objective-based curriculum accounts, for significant difference in acquisition of process skills in chemistry among high school science students as compared to conventional curriculum of science.

(vi) Significant differences exist in terms of acquisition of process skills among high school science students with differential intelligence.
(vi) Personality traits do not effect significantly the acquisition of process skills, irrespective of curriculum design and levels of intelligence.

(viii) (a) There is no significant effect on acquisition of process skills due to interactional effect of curriculum and intelligence.

(b) There is no significant effect on acquisition of process skills due to interactional effect of curriculum and personality.

(c) Interactional effect of intelligence and personality do not effect significantly the acquisition of process skills.

(d) There is no significant interactional effect of curriculum, intelligence and personality on the acquisition of process skills.

SAMPLE :

For the conduct of the experiment a sample of 150 students was raised randomly from tenth class students from governments and privately run schools of Ropar district. The average age of the sample was 16.1.

DEVELOPING OBJECTIVE BASED CURRICULUM :

Objective based curriculum was developed, taking three topics of chemistry, namely carbon and its allotropic
forms, compounds of carbon and general characteristics of metals and non-metals. The curriculum was developed keeping in view educational objectives expressed in behavioural terms.

DEVELOPING ACHIEVEMENT TEST:

An achievement test was locally developed to measure achievement in different categories of educational objectives taught through different designs of curriculum. The test was developed in order to measure achievement in three categories (knowledge, comprehension, application) of educational objectives as classified by B.S. Bloom in the cognitive domain. The final draft of the item consisted of 110 items, all of multiple choice type. The reliability of the test was calculated to be .90. The test was validated against content validity.

DEVELOPING PROCESS SKILLS TEST:

A process skills test to measure skills of observing, measuring of objects and phenomena, seeing problem and seeking ways to solve it, formulating hypothesis and proving it, solving the problem by giving reason, interpreting data and formulating conclusions. The final draft of the test consisted of 14 items. The reliability of the test calculated by test-retest method was found to be .670. The test was validated against content validity.
ANALYSIS OF DATA:

The data were analysed using descriptive statistics such as means, medians, standard deviation, skewness and kurtosis. To test the hypotheses, analysis of variance (2x3x2) measures was employed. In order to test the significance of differences between means t-ratios were calculated.

CONCLUSIONS:

(a) It can be concluded that objective-based curriculum and conventional curriculum in chemistry are equally effective so far as achievement in science is concerned. Further analysis of variance in respect of achievement in blooms categories of objectives revealed that group taught through objective-based curriculum secured significantly high mean score than group taught through conventional curriculum on the category of comprehension.

(b) Intelligence was found to be effective variance. F-ratio revealed that groups of differential intelligence differed in science achievement. It can be inferred that higher ability group performed better than average and below average ability groups.

(c) The t-ratio among above average intelligence groups taught through conventional curriculum and objective-based
curriculum \((A_1B_1 \text{ and } A_2B_2)\) was found to be significant at .01 level. The result revealed that high ability group following objective based curriculum achieved higher mean than the group following conventional curriculum. From this it can be concluded that the curriculum for students possessing superior ability should be designed according to educational objectives expressed in behavioural form. In case of average ability and below average ability groups \(t\)-values were insignificant. This result implied that average ability and below average ability groups did equally well irrespective of the type of curriculum.

For average and below average ability students conventional curriculum is equally suitable.

(d) Extroverts and introverts did not yield significant \(F\)-ratio. The result showed that extroversion and introversion are not responsible for any variance in achievement. It can be concluded that personality type namely extroversion/introversion did not account for differential achievement. It has been also found that personality type did not interact with intelligence or with curriculum design. This result implied that personality of the learner does not account for differential achievement.

(e) The critical ratio between gain mean process skills scores of the two groups was significant at .01 level which indicated
that the two groups differed significantly from one another in respect of acquisition of process skills. The mean score of group taught through objective-based curriculum was more effective than traditional curriculum.

(f) The t-ratios among above average, average and below average intelligence groups were found to be significant at .01 level. The result indicated that above average intelligence group had higher mean score on process skills test than average and below average intelligence groups. From above it can be concluded that high ability students achieve more in science when taught through objective-based curriculum.

(g) Contribution to variance due to personality type yielded non-significant F-ratio, which showed that personality type, namely extroversion and introversion do not effect significantly the acquisition of process skills. It can be concluded on the basis of above result that extroverts and introverts acquire equally well the process skills in science irrespective of type of curriculum and level of intelligence.

SUGGESTIONS FOR FURTHER STUDIES:

(i) The present study can be replicated involving more topics or entire course of chemistry at high school stage.

(ii) Research studies may be conducted by developing objective based curriculum in other school subjects.
(iii) Studies may be conducted by choosing other curriculum designs such as, activity centred, experience centred curriculum.

(iv) There is great scope for research studies in this field of curriculum development involving different sets of input, process and product variables.

(v) Research studies may be conducted to study implications of piagénian intellectual development stages for science curriculum development.

**IMPLICATIONS AND APPLICATIONS OF THE PRESENT STUDY:**

The findings of the present investigation have very important implications for improving the quality of instruction in the subject of chemistry at high school stage which may be summarized as below:

The achievement in comprehension category tends to increase if students are taught through objective-based curriculum. This curriculum type is equally effective for extroverts and introverts and for above average, average, and below average intelligent students. Traditional curriculum and objective-based curriculum are equally effective for knowledge and application categories. The study also reveals that objective-based curriculum is quite effective in developing process skills in chemistry.
In order to achieve gain in knowledge and application categories, any of the two curriculum type may be used but in order to develop the process skills, the objective-based curriculum tends to be more effective. As the scope of this study is very limited further research in this direction is required.

Objective-based curriculum can be introduced safely in our schools for teaching chemistry because the most important aims and objectives of teaching chemistry at high stage are comprehension and development of process skills.

Before introducing this curriculum the teachers must be trained properly to utilized this curriculum. In our schools no well equipped laboratories are available.

The technique is costly so this aspect should also be kept in mind while planning for teaching through objective-based curriculum. The teachers should be given training to improvise the equipments if immediate laboratories can not be provided. More studies should be conducted by taking other variable combinations before taking final decision for introduction of objective-based curriculum as mode of curriculum in chemistry for high classes.