



Analysis of paradigm shift from theoretical to practical aspect: A need of the day

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ABSTRACT

Syllabus is commonly designed in the direction of objectives so, that desired learning objectives are achieved in the end of academic session. It is helpful in creating interaction between pupil and mentor. It comprises information that assists the educational accomplishment of pupils. It gives guideline for student's achievement. The course content acts as roadmap for attainment. The syllabus is designed in such a manner that it caters students need. The effective syllabus produce productive learner. This study was intended to investigate the current syllabus of intermediate level chemistry subject. The data was gathered from students enrolled in Government Degree Colleges and Government Higher Secondary Schools of district Peshawar. 680 students were selected as sample of study. Major finding of study include that most of syllabus is theory based. The syllabus does not cater psychological and social needs. Syllabus does not contain effective and engaging activities. The syllabus of practical work is substandard. It is suggested that activity based curriculum may be introduced at intermediate level. Gradual shift from theory to practical side is desired. Restructuring syllabus of practical work is need of the day.

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1. Introduction

The main aim of education in developing country like Pakistanis to produce workforce that meet nationally recognized skill standard who are capable to make maximum consumption of the state natural and human assets. The foremost task of education is to increase self-reliance of country people and lessen their reliance on outside assets and assistance (Asian Development Bank, 2000).

The ultimate aim of education is to enable students to become a good technician, scientist and citizens. The desire course outcomes need to be listed in order of importance rather than in order of subject matter

(Malhotra, 2007).

The major target of education is harmonious development of individual. Unfortunately education system of Pakistan failed to impart true knowledge, as it focuses on theoretical aspect of learning rather than practical. Psychomotor skills, activities, creative and innovative thinking are neglected in our curriculum. Examinations are mean of testing memorization power instead of measuring other mental abilities. (Singh & Dangwal, 2011).

Traditional and outdated curriculum is followed in our country that could not meet the need and demand of the society. The education system is not build in the light of psychological, philosophical and sociological foundations. (Louis, 1987).

Science subject is related with theories, laws experiments, principles and practical's (Klein, 2006). Practical work is compulsory aspect of science. It should be designed in a manner that it may encourage rational and analytical thinking (Tiberghien et al., 2001). The science room has significant importance as it provides a favourable environment for learning science as compare to conventional classroom. Learning by doing enable students to identify the problem, design procedures to solve the problem and draw inferences. Scientific activities encourage students toward learning and maintain their interest. It also gives guidance to the students about scientific procedure (Chiappetta & Koballa 2006).

It was recommended by National curriculum 2006 that inquiry-based teaching strategies should be used in feasible circumstances. Learner centered approach is appropriate for students, wherein they develop specific understanding from proof. Hand on activities should be provided to learners to improve their critical thinking and reasoning abilities. Description of topic should be done by exemplifying the concept from local setup. It is beneficial to provide direct and real exposure to nature through test center and field work, while introducing new topic. Moreover opportunities should be provided to learner to solve problems at their own level. Students may be encouraged to refine their ideas through discussion. They should also be motivated toward cooperative learning and group activities (Ministry of education, 2006). The National Educational policy (2009), emphasized on outcome based and objective driven curriculum that concentrate on productive consequences. It proposed curriculum that provide opportunities for development of the essence of inquiry, capability of problem solving, rational thinking, team work and the ability of self-directed learning. This policy stated that curriculum concerned will also encompass vital social problems.

2. Methods and procedure

It is a descriptive study. The study was carried through five point Likert scale questionnaire based on 14 items along with two open ended questions. Population of the study comprised of 30 Government Higher Secondary Schools (19 for boys and 11 for girls) and 17 Government Degree Colleges (09 for boys and 08 for girls). The total number of students enrolled in chemistry subject at Government Higher Secondary Schools and Government Degree Colleges of district Peshawar were 9030. Out of which 1668 students (1003 boys and 665 girls) were enrolled in the subject of Chemistry at Government Higher Secondary Schools and 7362 (5715 boys and 1647 girls) at Government Degree Colleges in district Peshawar. The sample of the study was comprised of eight (04 Males & 04 Females) Government Higher

Secondary Schools (GHSSs) and eight (04 Males & 04 Females) Government Degree Colleges (GDCs) of district Peshawar. Students sample comprised of 680 students. 320 students of chemistry subject were selected from GHSSs and 360 students from GDCs. The 40 participants from each of the eight (08) GHSSs and 45 from eight (08) GDCs were selected randomly.

3. Data analysis

The collected data was tabulated and analyzed through frequency distribution, percentage method and Independent –Samples T Test.

Table 4.1 Distribution of the Responses of Students on Construct Course Content

Items	SA (f)	A (f)	UD (f)	D (f)	SD (f)
Chemistry syllabus is updated and compete universal standard	47 (6.9%)	62 (9.1)	64 (9.4%)	164 (24.1%)	342 (50.3%)
Chemistry syllabus is mostly based on theoretical work	477 (70.1%)	156 (22.9%)	09 (1.3%)	20 (2.9%)	17 (2.5%)
Students prefer selective study, instead of studying whole syllabus	210 (30.9%)	55 (8.1%)	00 (0%)	07 (1%)	408 (60%)
Chemistry syllabus is designed according to the					
i. Intellectual ability of students	52 (7.6%)	101 (14.9%)	33 (4.9%)	270 (39.7%)	224 (32.9%)
ii. Psychological needs of the students	38 (5.6%)	101 (14.9%)	48 (7.1%)	264 (38.8%)	228 (33.5%)
iii. Social need	57 (8.4%)	99 (14.6%)	34 (5%)	197 (29%)	292 (42.9)
Present chemistry course content enhance critical and rational thinking of the students	87 (12.8%)	131 (19.3%)	36 (5.3%)	185 (27.2%)	238 (35%)
Course content contain effective and engaging activities	94 (13.8%)	98 (14.4%)	23 (3.4%)	192 (28.2%)	223 (40.1%)
Concepts are briefly explained in simple and precise manner in the text book	78 (11.5%)	136 (20%)	14 (2.1%)	176 (25.9%)	275 (40.4%)
Exercise at the end of the textbook leads to brain storming	149 (21.9%)	164 (24.1%)	26 (3.8%)	200 (29.4%)	140 (20.6%)
Current Syllabus of practical work enhance knowledge and skills of learners	150 (22.1%)	97 (14.3%)	33 (4.9%)	155 (22.8%)	243 (35.7%)
Practical copy is very helpful in boosting knowledge and information of students	108 (15.9%)	88 (12.9%)	13 (1.9%)	182 (26.8%)	289 (42.5%)
Chemistry teacher effectively demonstrate practical work in laboratory	91 (13.4%)	59 (8.7%)	14 (2.1%)	186 (27.4%)	330 (48.5%)
50% of chemistry curriculum needs to be based on practical work.	468 (68.8%)	169 (24.9%)	09 (1.3%)	13 (1.9%)	21 (3.1%)

Note ISA= Strongly Agree, A= Agree, UD=Undecided, D=Disagree, SD Strongly Disagree

Table 4.1.1 indicated that 16% respondents were of the opinion that chemistry syllabus is updated and compete universal standard, while 74.4% disagree with statement. 9.4% respondents remained undecided about statement concerned.

Table 4.1.2 indicated that 93% respondents were of the opinion that chemistry syllabus is mostly based on theoretical work, while 5.4% disagree with statement. 1.3% respondents remained undecided about statement concerned.

Table 4.1.3 indicated that 39% respondents were of the opinion that students prefer selective study, instead of studying whole syllabus, while 61% disagree with statement. 0% respondents remained undecided about statement concerned.

Table 4.1.4.i indicated that 22.5% respondents were of the opinion that chemistry syllabus is designed according to the Intellectual ability of students, while 72.6% disagree with statement. 4.9% respondents remained undecided about statement concerned.

Table 4.1.4.ii indicated that 20.5% respondents were of the opinion that chemistry syllabus is designed according to the psychological needs of the students, while 72.3% disagree with statement. 7.1% respondents remained undecided about statement concerned.

Table 4.1.4.iii indicated that 23% respondents were of the opinion that chemistry syllabus is designed according to the Social need, while 71.9% disagree with statement. 05% respondents remained undecided about statement concerned.

Table 4.1.5 indicated that 32.1% respondents were of the opinion that present chemistry course content enhances critical and rational thinking of the students, while 62.2% disagree with statement. 5.3% respondents remained undecided about statement concerned.

Table 4.1.6 indicated that 28.2% respondents were of the opinion that course content contains effective and engaging activities, while 68.3% disagree with statement. 3.4% respondents remained undecided about statement concerned.

Table 4.1.7 indicated that 31.5% respondents were of the opinion that concepts are briefly explained in simple and precise manner in the textbook, while 66.3% disagree with statement. 2.1% respondents remained undecided about statement concerned.

Table 4.1.8 indicated that 46% respondents were of the opinions that exercise at the end of the textbook leads to brain storming, while 50% disagree with statement. 3.8% respondents remained undecided about statement concerned.

Table 4.1.9 indicated that 46% respondents were of the opinion that current syllabus of practical work enhances knowledge and skills of learners, while 58.5% disagree with statement. 4.9% respondents remained undecided about statement concerned.

Table 4.1.10 indicated that 28.8% respondents were of the opinion that Practical copy is very helpful in boosting knowledge and information of students, while 69.3% disagree with statement. 1.9% respondents remained undecided about statement concerned.

Table 4.1.11 indicated that 22.1% respondents were of the opinion that chemistry teacher effectively demonstrate practical work in laboratory, while 75.9% disagree with statement. 2.1% respondents remained undecided about statement concerned.

Table 4.1.12 indicated that 93.7% respondents were of the opinion that 50% of chemistry curriculum need to be based on practical work, while 05% disagree with statement. 1.3% respondents remained undecided about statement concerned.

Ho1: Mean scores of female students of GHSSs & GDCs and Male students of GHSSs & GDCs do not significantly differ on construct Course Content.

Table-4.2: Gender Wise Comparison of Opinion of Chemistry Students of GHSSs & GDCs on Construct Course Content of Chemistry Curriculum.

Construct	Gender	N	Mean	Std. Deviation	P-Value
Course Content	Male	340	4.9820	11.81794	.149
	Female	340	3.8973	7.21057	

¹Note.Independent-Samples T Test $t = 1.445$ $df = 678$

The table 4.2 indicated that $P > 0.05$, thus average score on construct Course Content for male students ($M = 4.9820$, $SD = 11.81794$, $N = 340$) is insignificantly different than female students ($M = 3.8973$, $SD = 7.21057$, $N = 340$) opinion scores. Hence the two groups on the basis of gender could be treated as equal on construct Course Content and null hypothesis (H_0) is accepted.

Ho2: Mean scores of male, female students of GHSSs & male, female students of GDCs do not significantly differ on construct Course Content.

Table-4.3: Institute Wise Comparison of Opinion of Chemistry Students on Construct Course Content of Chemistry Curriculum.

Construct	Gender	N	Mean	Std. Deviation	P-Value
Course Content	GHSSs	320	5.0985	11.59342	.098
	GDCs	360	3.8539	7.83412	

¹Note.Independent-Samples T Test $t = 1.656$ $df = 678$

The table 4.3 indicated that $P > 0.05$, thus average score on construct Course Content for GHSSs students ($M = 5.0985$, $SD = 11.59342$, $N = 320$) is insignificantly different than GDCs students ($M = 3.8539$, $SD = 7.83412$, $N = 360$) opinion scores. Hence the two groups on the basis of institute could be treated as

equal on construct Course Content and null hypothesis (Ho2) is accepted.

4. Findings

- The present curriculum fails to provide quality education, even it cannot compete curriculum presented by Federal or Punjab Government.
- F.Sc syllabus is mostly theory based and too lengthy, hence it is difficult to learn whole knowledge given in the textbook.
- Chemistry is considered as an imaginary subject, as it has little relevancy with real life. Most of the topics are based on abstract things.
- Textbook failed to explain some topic in a precise manner. Textbook knowledge is not good enough. Moreover mistakes are there in the chemistry textbook.
- Course outline designed for practical work is unsatisfactory and valuable stuff is unavailable in practical copy. Both teachers and students took little interest in laboratory work. Teachers avoid explaining detail of practical and students prefer to remain outside during practical time.
- According to some students practical are not actually performed in laboratories, teachers only emphasize on completion of course work based on theory. Practical are usually performed at the end of academic session in haphazard manner. Teacher performs 4-5 practical in a single day without providing attention to those who are standing at distance.
- There is scarcity of equipment's and chemicals in the laboratories.
- Most of the students were of the opinion that teachers are not devoted toward their profession. Teachers mostly rely on textbook knowledge in classroom, which is not sufficient for learning. Some of the teachers read out the textbook and translate book in Urdu language, instead of delivering proper lecture.
- Current curriculums do not provide skillful education to the students.
- Important topics of chemistry subject that are related with daily life are either ignored or not briefly explained in textbook.
- Language used in chemistry textbook is too tough; especially last two chapters of first year book. Some of the concepts are not clearly explained. Chemistry textbook is written in English language, however student face difficulty in understanding the concept in English language.

5. Recommendation

- Activity based learning should strongly be encouraged. Activities should be included in syllabus to enables students to solve minor problems of daily life related with chemistry subject. Teacher should also relate textbook knowledge with daily life examples, so that students become aware about the worth of given knowledge and take interest in study.
- Uniform curriculum should be implemented all over Pakistan. There are many topics in the KPK textbooks which haven't been explained well enough as compared to the elaboration of the same topics in the Federal textbooks .Moreover, old concepts, non-applicable theories and models should be eliminated from textbook.

- Mistakes in the textbook should be rectified well in time. Simple language should be used for proper explanation of the textbook. Textbook content should contain advance and up-to-date information along with MCQs. Multiple books should be followed for teaching subject of chemistry. Well labeled diagram should be introduced with every topic of chemistry subject.
- Actual time period allocated for each session is round about five month, which should be increased, so that better learning takes place. Syllabus should be cut short due to short time period allocated for academic session. Class duration of science subjects should be increased to one hour. Vacations should be eliminated from calendar year. Friendly environment is necessary for better learning.
- Curriculum should be designed according to mental caliber of average student. Latest invention and innovation in the field of science and technology should be incorporated in the curriculum. Use of writing board is very effective in learning therefore teacher should use the board during delivery of lesson. Further interactive approach should be used in the classroom.
- Well-equipped laboratory should be provided to Government institutes. Educational institutes should be furnished with all the facilities and instrument required for smooth functioning. Practical class should be arranged on daily basis. Individual performance of experiments on behalf of each student should be ensured). Some practical work program need to be arranged annually at intermediate level to enhance the abilities of the students.
- More funds should be allocated for education sector. Study tours should be arranged for practical exposure of students, so that they observe and study different industries, scientific institutes etc. Scholarship should be awarded to students at Intermediate level.
- Topics in the book should be arranged in psychological order, first easy topic should be introduced in the textbook and then slowly and gradually difficult and advance topics may be presented.
- Chemistry textbooks at intermediate level should be build up in Urdu language or Urdu translation or meaning should be included in the textbook, as it is difficult for those to understand the content of book, who have done matriculation from government schools.
- No significant difference was found between female students of GHSSs & GDCs and male students of GHSSs & GDCs on construct Method of Teaching (Table 2).
- No significant difference was found between male, female students of GHSSs and male, female students of GDCs on construct Course Content (Table 3).

6. Conclusion

The study showed that syllabus of chemistry subject is still streamlined on theoretical grounds. There is little space for practical work at intermediate level. The course content is devoid of effective and engaging activities that arouse curiosity among pupil and quench their thirst for actual learning. The syllabus does not provoke critical and rational thinking of students. The practical work is confined to testing of pre-set knowledge. Unfortunately this testing of knowledge is given little importance. As the

practical is rarely performed in proper manner in most of laboratories. The teachers also give due importance to theoretical aspect of syllabus as maximum weightage is assigned to theoretical portion in examination. The course content does not impart scientific knowledge and skill. The textbook also have several shortcomings. Some of topics are not precisely explained. Some topics are unnecessarily repeated in the textbook. Exercise given at the end of chapter does not articulate thought provoking question. It has been suggested that syllabus of chemistry subject may be revised and rationalized on activity based curriculum. Proper weightage may be given to practical work to equip pupil with skill and latest scientific knowledge.

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