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RESEARCH ARTICLE

APPLICATION OF BLOOM'S TAXONOMY OF EDUCATION OBJECTIVES IN WRITING INSTRUCTIONAL OBJECTIVES FOR SCIENCES SUBJECT AT SECONDARY SCHOOL LEVEL: A CASE STUDY OF SINDH

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ABSTRACT

In this work, nanocrystalline The purpose of this mixed method study was to assess examine the objectives of Bloom's taxonomy its usage and at secondary level while teaching the sciences subject in the Sindh. The population of this study was 508 teachers of science and 50 headmasters. Questionnaire and an interview protocol were used to collect the data through stratified random sampling technique Mean Chi square were interpretation of the data. Used for The qualitative findings highlighted that teacher teaches science subjects and apply exam-oriented strategy without touching the Bloom's taxonomy .Majority of teacher teaches science subjects in traditional way .They do not apply student-centered and motivational techniques and appropriate assessment mechanism while teaching sciences subject. The result of the study revealed that the total 83% teachers are failing to use first three levels of Bloom's taxonomy namely knowledge, comprehension and application while teaching sciences subject. The researcher strongly recommended applications of Bloom's taxonomy and its objectives are necessary for science teachers at secondary level to teach sciences subject effectively in order to develop the students' concepts rather than make them ableto choose rote method of learning. Moreover researcher also recommended that teachers should develop their interest in sciences subject and apply latest teaching methodology while teaching science. The administration, teaching training institutes, head masters trained their teachers should strictly monitor them that at what extent they successfully use the Bloom's taxonomy in the classroom learning.

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INTRODUCTION

Objectives and activity became purposeful if it is carried out effectively, for effective implementation, planning the task is essential. Planning can be done on the basis of goal, aims and the objectives of the activity. (RajanSonika 2012). A good instructional objective must describe a learning outcome that says what the student will able to do, know or believe as the result of instruction it is customary to think instructional objectives in three aspects cognitive, affective and psychomotor. These terms come from the work of Benjamin Boom and others who developed taxonomy of educational objectives; cognitive objectives deal with the intellectual abilities, knowledge, concepts and understanding. Affective objectives include the feelings, Interests, attitudes and appreciation that may result from instruction.

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The psychomotor domain includes objectives that stress motor development, muscular coordination and physical skill. Traditionally cognitive objectives have received for more attention over the years from the affective or psychomotor objectives, the cognitive area become fertile ground for writing instructional objectivesthat stress performance in science knowledge and conceptual understanding.

Background of the Study: Teaching and learning are correlated terms both depends on one another. Teaching is nothing without learning. Every teacher tries level best for students learning. Every teacher uses various methods and techniques to make teaching effective and use full. What a teacher obtains as instructional output in the teaching- learning process are nothing but some type of behavioral changes in the pupils that may be expected as a result of the instruction related with a particular lesson, unit or subunit of the subject. Instructional objectives are thus nothing but description of the

pupil's terminal behavioral expected out of the ongoing class room instruction (Mangal .S.K and Mangal Uma). Basically science is "to know" especially it develop human being understating of the matter and material world science in these words "it is the study of problem where ever children live formally stated it is the natural environment. (Rajansonika 2012). The science is process as well a product (Rajansonika 2012) various theories, principles etc. are include in the approach of science as product newton's laws of motion and kinetic molecular theory are the example product of science. Scientific attitudes and scientific methods are part of science as a process although both approaches are important but product approach is theoretical because laws, theories and principles usually we study but science process we adopt through comprehension and application of emphasis was being upon reading, writing and arithmetic..Than due to changing situation scientific knowledge. Until 1950's practically no science was taught in the elementary schools, the of the world our government decided to promote science education in the country. Now a days," The status of science education in Pakistan is compulsory at elementary level (Primary and middle) and an optional at secondary and higher secondary levels. (Iqbal Muhammad Hafiz 2011).

Sindh is province of Pakistan here teaching of science starts by the class III and go ahead till secondary and higher secondary levels vi –viii are the part of secondary classes and traditionally they are considered as lower secondary classes too, general science is compulsory subject at these classes and ix and x classes are consider as secondary classes ; in ix class biology is compulsory since 1975 and chemistry are compulsory for science group; general science is compulsory for humanities group and in x class physics is compulsory for science group students. In the field of education and particularly in school education terms are used frequently which are aims and objectives; although both are considered same in meaning but they are different conceptually and practically. "An aim is that which gives a sense of order and direction to an activity". (Dash B.N 2006).An aim means a foresight in advance for the end consequences and the fruit of action. Further he says it is foreseen end that gives a direction to the activity influence each step towards the end. To achieve aims we have to process systematically; this systematic and organize way develop another term which named objectives. "An objective is a point or an end point of something toward action to desire. (Pathak.R.P and Chaudhary Jagdeesh) What should be aims and objective of teaching learning process or education process?. It is thought provoking question and crucial issue; for the answer of this question and solution college teachers assembled in America. This concept of taxonomy in education was initiated in 1948 a meeting of American psychological association in Boston. (Rajansonika 2012) After 1948 many meetings were held and 1953 a threefold division of the educational objectives cognitive, affective and psychomotor was developed by professor.P.S.Bloom and his associates. These three division called domains (Rajansonika 2012) Bloom's taxonomy has been used by teachers for more than fifty years and this is clears testimony to the fact that many educators have found it valuable one of its attractions has been its simplicity. The structure is relativity easy to understand and apply in most learning areas, because the taxonomy was designed to provide a language for talking about objectives it is easily applied to the formation of outcomes. Bloom's taxonomy is way of distinguish the fundamental question with the education system Boom taxonomy serves as the back bone of many teaching philosophies in particular those that learn more toward skills rather than content, the emphasis on higher order thinking inherent in such philosophies is based on the top level of taxonomy.. Bloom's taxonomy refers to a classification of the different objectives that teachers set for the students. It divides educational objectives into three domains cognitive, affective and psychomotor. Within the domains learning at the lower levels is depend on having attainted pre requisite knowledge and skill at lower level. Bloom developed the taxonomy of cognitive objective by quantitative expressions and different types of thinking more ever this system has been developed to teaches to identify the types of learning excepted from the student. In addition illustrate the wide array of learning out comes that be included in any given instructional area.

Objectives of the study

- To investigate the usage of Bloom's taxonomy's objectives in lesson planning while teaching science subjects at secondary level.
- To evaluate the importance of Bloom's taxonomy's objectives for student learning at secondary level.
- To find out teachers acceptance of Bloom's taxonomy's objectives to check their subject base knowledge at secondary level.
- To find out relationship between Bloom's taxonomy's and teachers instructional objectives at secondary school.

Research Questions

Q No: 1 To what extent teachers of science are aware about subject based knowledge in term of Bloom's Taxonomy at secondary level?

Q No: 2 To what extent, there is direct relationship between Bloom's taxonomy and in writing instructional objectives for sciences subject at secondary level?

Q No: 3 Are Bloom's taxonomy's objectives measurable and testable for science teachers at secondary school level?

Q No: 4 Does Bloom's taxonomy enhance useful learning at secondary school level?

Q No: 5 Is Bloom's taxonomy helpful in promoting the ability of problem solving and creativity among science students at secondary school level?

Research Hypothesis

- There is no difference between teachers of science: subject based knowledge about Bloom's taxonomy of educational objectives at secondary school level.
- There is any direct relationship between Bloom's taxonomy of educational objectives with writing instructional objectives of teachers of science at secondary school level.
- Bloom's taxonomy's practice is measurable and testable for teachers of science at secondary school level.
- There is any direct relationship between effective learning and Bloom's taxonomy of educational objectives at secondary school level.

- Bloom's taxonomy of educational objectives is helpful in promoting the ability of problem solving and creativity among science student at secondary school level.

Research Design: A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. John w. Creswell says research design which I refer to as the plan or proposal to conduct, involves the intersection of philosophy, strategies of inquiry and specific methods.P-5. Qualitative design is help full for elaboration and comprehension the meanings, persons or groups ascribe to a social or human problem. It is a way of represent data in verbal form rather than numerical form. Mixed methods research is another emerging and becoming popular approach in the research especially in the field of educational research in this approach quantitative and qualitative approaches are used together for collecting data and drawing the conclusions. "It also involves the use of both approaches in random so that the overall strength of a study is greater than either qualitative of quantitative (Creswell and plan Clark 2007).

Population of the Study: Population is a tool which help researcher to select sample appropriately. According to John w. best "The population is the group of interest to the researcher the group to which she or he would like the results of the study to the generalizable. Sindh is vast in length. Administratively it is distributed in 05 divisions and 29 districts. There as 1710 government secondary schools that is situated in Sindh. Researcher focused on the teachers they teach science subjects like biology, chemistry, physics and general science. Usually Sind in terms of population is distributed Urban and Rural areas. Researcher selected 60% population by Urban areas because now a days, Researcher live in the capital city of Sindh Karachi which is biggest city of Sindh and as well as Pakistan, another reason is that Urban areas are convenient for the researcher to reach there and save time and money as well as. Researcher selected 40% population by rural areas due to some difficulties but researcher gave the respect to the Rural Sindh as well as for finding facts.

Sampling Size: The basic goal of research is to find out principles that would be applicable universally. The research is concerned to generalize the data beyond that of immediate sample. To get total population in order to reach at generalization not practically possible. Researcher's population is vast and huge luckily the technique of sampling is available to researchers for drawing generalization for conclusion and result. Sampling is convenient technique to take samples from whole population. There are different sampling strategies are applied in educational research for the selection of the appropriate samples from the total population, usually sampling divided in two major types, They are probability or random sampling strategies and the other is non-probability or non-random sampling strategies

Research instruments: There are number of devices are available to researcher due to the nature of the study here questionnaire and Interviews would be useful. Questionnaire would help to collect data quantitatively and interview for qualitatively. The bases of the questionnaires are the questions..The researcher used questionnaire for the teachers to get required information easily. Researcher prepared interview for the headmasters to obtain not only data but cross matches the information produced by secondary school teachers. It is common and popular tool for data collection in social sciences particularly in the educational research. Cohenetal (2007:351). "An interview may be regarded as un usual method in that involves the gathering data through direct verbal interaction between individuals. In this sense, it differs from the questionnaire where the respondent is required to record in some way the responses to set questions". There are different classifications and types of interview but researcher selected semi-structured interview due to its effectiveness and need of the study.

DISCUSSION

Researcher always tries to discover real facts that are hidden by the world, so he develops a problem and start planning to find it. To formulate hypothesis investigator analyses the whole situation. This will provide the path for starting work in sequence, gathering data is very important for testing hypothesis in research, to get results it is very necessary to analyses the data. According to Kulbir Singh Sidhu, analysis of data means studying that inherent facts or meaning.

Here researcher analyses data by using mean and Chi-Square.
Item No 1:
What do you know about Bloom's taxonomy of educational objectives?

Response: Twenty head masters believed that they had poor knowledge regarding the Bloom's taxonomy of educational objectives. They always found them lacking while using Bloom's taxonomy's application in the classroom learning. They never used to get benefits from them. Eighteen head masters replied that they had listen and read about Bloom's taxonomy, but never used in the classroom learning. Twelve head masters responded positively and used the Bloom's taxonomy but even they know the importance Bloom's taxonomy of educational objectives. They achieve fruitful result in their class while using the Bloom's taxonomy of educational objectives

Item no 2 what do you know instructional about objectives?

Response: In response to this question sixteen headmasters replied that it's very difficult for them to understand the instructional objectives they focus on content rather than instructional objectives. Twelve headmasters responded positively that they know the instructional objectives frequently they used this in their class room learning. Another group of headmasters were not happy because of their poor educational background and knowledge about the instructional objectives
Item No: 3 At what extent Bloom's taxonomy is helpful to set instructional objectives?

Response: In response to this question majority of headmasters was agreed with researcher that Bloom's taxonomy is helpful for teacher to set proper objectives for teaching learning process. Twenty seven head masters agreed that teachers must be aware that importance and uses of Bloom's taxonomy of educational objectives, eight headmasters were not agreed with the researcher. They think that Bloom's taxonomy of educational objectives does not help in the class room learning. They accept a teacher face many issues and meets the different types of the learner. Fifteen headmasters were using Bloom's taxonomy of educational objectives with their own personal experience while teaching in class room, they neither

supporting, nor against the Bloom's taxonomy of educational objectives they believe that there should be learning any way, learner should set advantages in this regard.

Item No: 4 At what extent teachers use written lesson plan for teaching science?

Response: In this response to the question forty headmasters agreed with the researcher, that they think lesson plan is basically a road map to set the learning outcomes for the teaching learning process. Ten headmasters had different opinion they understand that science subject can be taught without lesson planning because they are partially based and time consuming.

Item No: 5 At what extend the teachers are able to write instructional objectives properly

Response: Opinion of headmasters was divided into two ways thirty headmasters were supporting to the researcher and twenty were against the researcher. The first group believes that the teachers of science are able to recognize, identify and write instructional objectives properly, they know their importance but another group of twenty headmasters think the teachers of science are not able to write instructional objectives due to their poor knowledge about the instructional objectives. They believe that our teachers of science must learn and understand the importance of instructional objectives.

Item No 6 Is your teachers of science have appropriate knowledge of Bloom's taxonomy of educational objectives?

Response: Out of fifty only ten headmasters tell that teachers of science have appropriate knowledge of Bloom's taxonomy of educational objectives due to professional education and training, seventeen head masters agreed that teachers of science have partial knowledge of Bloom's taxonomy of educational objectives and twenty three headmasters responded that their teachers of science are not aware about the Bloom's taxonomy of educational objectives although most of teachers of science are professional degree holders . Most of headmasters are on the same page that professional education for teachers should have quality. They also demanded refresher courses for teachers of science particularly in the area of instructional objectives.

Item No 7: How much your teachers use Bloom's taxonomy in developing instructional objectives for sciences subject?

Response: In responses to this question thirty five headmasters admitted that the teachers of science do not use Bloom's taxonomy for developing instructional objectives due to lake of knowledge about the Bloom's taxonomy, ten headmasters that there teachers of science consider Bloom's taxonomy of educational objectives for development of instructional objectives. Five claims that the Bloom's taxonomy provides foundation to teachers of science for developing instructional objectives for the lesson planning. All over researcher conclude that majority of head masters accept teachers of science are not using Bloom's taxonomy of instructional objectives.

Item No 8 How Bloom's taxonomy oriented instructional objectives help teachers of science to frame lesson plan effectively?

Response: Fifteen headmasters agreed that Bloom's taxonomy of educational objective useful and fruitful for effective lesson planning. Bloom's taxonomy oriented instructional objectives are clear understandable and measurable so they provide milestone of learning. Thirty five headmasters gave opinion against their fellows they do not agree Bloom's taxonomy's oriented instructional objectives help teachers of science in framing lesson plan effectively. They believe others source are more helpful and use full for effective planning for lessons.

For the testing hypothesis researcher construct a questionnaire for data collection. Then Chi Square was used for interpretation of the data.

Hypothesis 01: There is no difference between teachers of science, subject based knowledge about bloom's taxonomy of educational objectives at secondary school level.

Responses	Teachers	Total	Percentage
Strongly agree	134+86+107+122+83	532	106.40
Agree	139+95+140+94+117	585	117.00
Un decided	95+114+90+81+104	484	96.80
Strongly disagree	72+122+91+103+110	498	99.60
Disagree	68+91+80+108+94	441	88.20

Step No 1: Null hypothesis and alternative hypothesis: H_o= There is difference between teachers of science, subject based knowledge about bloom's taxonomy of educational objectives at secondary school level.

H_1= There is no difference between teachers of science, subject based knowledge about bloom's taxonomy of educational objectives at secondary school level.

Step No2: Level of significance:

X = 0.05

Step No3: Test statistics to be used:

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

	S.A	A	U.D	S.D.A	D.A
Observed Frequency (F_o)	106.40	117.00	96.80	99.60	88.20
Expected Frequency (F_e)	101.60	101.60	101.60	101.60	101.60

The calculation of $(F_o - F_e)$ for each category

4.8015.40-4.80-2.00-13.40

The calculation of $(F_o - F_e)^2$ for each category

23.04237.1623.044.00179.56

The calculation of $\frac{(F_o - F_e)^2}{F_e}$ for each category

X^2 =0.226771653, 2.334251968, 0.226771653, 0.03937007, 1.767322834

The summation of all these $\frac{(F_o - F_e)^2}{F_e}$ will give the Chi–Square

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

X^2 = 0.226771653 + 2.334251968 + 0.226771653 + 0.03937007 + 1.767322834

X^2 = 4.594488186
Chi – Square = 4.594488186

Step No4: Critical value and degree of freedom:

Degree of freedom (df) = (r-1) (c-1)

(df) = (5-1) (2-1)
(df)= (4)(1)
(df) = 4

Step No5: Compare the computed Chi-Square value to the tabulated Chi-Square value: If computed Chi-Square calculated value is greater than the tabulated value, reject Null hypothesis (H_o) otherwise accept (H_o)

X^2= Cal < Tab
X^2 = 4.594< 9.488

Step No6: Decision: hence that the tabulated value of Chi-Square at 4 degree of freedom is 9.488, hence the calculated value of Chi-Square could not reach to a value of 9.488 which is the significant value of Chi-Square to accept the null hypothesis at 0.05 and conclude that there is differencebetween teachers of science subject based knowledge about bloom's taxonomy of educational objectives at secondary school level.

Hypothesis No: 2: There is any direct relationship between bloom's taxonomy of educational objectives with writing instructional objectives of teachers of science at secondary school level.

Responses	Teachers	Total	Percentage
Strongly agree	125+151+113+129+136	654	130.80
Agree	128+143+122+133+138	664	132.80
Un decided	80+69+101+94+84	428	85.50
Strongly disagree	87+59+107+77+74	404	80.80
Disagree	88+86+65+75+76	390	78.00

Step No 1: Null hypothesis and alternative hypothesis:

H_o= There is no direct relationship between Bloom's taxonomy of educational objectives with writing instructional objectives of teachers of science at secondary school level.

H_1 = There is any direct relationship between Bloom's taxonomy of educational objectives with writing instructional objectives of teachers of science at secondary school level.

Step No 2: Level of significance:

X = 0.05

Step No 3: Test statistics to be used:

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

	S.A	A	U.D	S.D.A	D.A
Observed Frequency (F_o)	130.80	132.80	85.50	80.80	78.00
Expected Frequency (F_e)	101.60	101.60	101.60	101.60	101.60

The calculation of (F_o - F_e) for each category

29.2031.20-16.60-20.8023.60

The calculation of (F_o - F_e)^2 for each category

852.64973.44275.56432.64556.96

The calculation of $\frac{(F_o - F_e)^2}{F_e}$ for each category

X^2 =8.392125984, 9.581102362, 2.712204724, 4.258267716, 5.481889763

The summation of all these $\frac{(F_o - F_e)^2}{F_e}$ will give the Chi–Square

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

X^2 =8.392125984 + 9.581102362 + 2.712204724 + 4.258267716 + 5.481889763

X^2 =30.42559053
Chi – Square = 30.42559053

Step No 4: Critical value and degree of freedom:

Degree of freedom (df) = (r-1) (c-1)
(df) = (5-1) (2-1)
(df) = (4) (1)
(df) = 4

Step No 5: Compare the computed Chi-Square value to the tabulated Chi-Square value: If computed Chi-Square calculated value is greater than the tabulated value, reject Null hypothesis (H_o) otherwise accept (H_o).

X^2 = Cal > Tab
X^2 = 30.425> 9.488

Step No 6: Decision: Hence that the tabulated value of Chi-Square at 4 degree of freedom is 9.488, hence the calculated value of Chi-Square could not reach to a value of 9.488which is the significant value of Chi-Square to reject the null hypothesis at 0.05 and conclude that There is no such direct relationship between bloom's taxonomy of educational objectives with writing instructional objectives of teachers of science at secondary school level.

Hypothesis No: 3 Bloom's taxonomy's practice is measurable and testable for teachers of science at secondary school level

Responses	Teachers	Total	Percentage
Strongly agree	142+119+116+106+98+108	689	114.83
Agree	138+131+128+97+107+129	730	121.66
Un decided	79+91+82+113+112+83	560	93.33
Strongly disagree	65+83+89+102+87+101	527	87.33
Disagree	84+84+93+90+104+87	542	19.33

Step No 1: Null hypothesis and alternative hypothesis

H_o= Bloom's taxonomy's practice is not measurable and testable for teachers of science at secondary school level.
H_1 = Bloom's taxonomy's practice is measurable and testable for teachers of science at secondary school level.

Step No 2: Level of significance

X = 0.05

Step No 3: Test statistics to be used:

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

	S.A	A	U.D	S.D.A	D.A
Observed Frequency (F_o)	114.83	121.66	93.33	87.83	90.33
Expected Frequency (F_e)	101.60	101.60	101.60	101.60	101.60

The calculation of $(F_o - F_e)$ for each category
13.2320.06-8.27-13.77-11.27
The calculation of $(F_o - F_e)^2$ for each category
175.0329402.403668.3929 189.6129127.0129

The calculation of $\frac{(F_o - F_e)^2}{F_e}$ for each category

X^2 =1.722764763, 3.960665354, 0.673158464, 1.8662687, 1.250126968

The summation of all these $\frac{(F_o - F_e)^2}{F_e}$ will give the Chi–Square

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

X^2 =1.722764763 + 3.960665354 + 0.673158464 + 1.8662687 + 1.250126968
X^2 =9.472984249
Chi – Square = 9.472984249

Step No 4: Critical value and degree of freedom

Degree of freedom (df) = (r-1) (c-1)
(df) = (5-1) (2-1)
(df) = (4) (1)
(df) = 4

Step No 5: Compare the computed Chi-Square value to the tabulated Chi-Square value: If computed Chi-Square calculated value is greater than the tabulated value, reject Null hypothesis (H_o) otherwise accept (H_o).

X^2 = Cal < Tab
X^2 = 9.472< 9.488

Step No 6: Decision: Hence that the tabulated value of Chi-Square at 4 degree of freedom is 9.488, hence the calculated value of Chi-Square could not reach to a value of 9.488 which is the significant value of Chi-Square to accept the null hypothesis at 0.05 and conclude that Bloom's taxonomy's practice is not measurable and testable for teachers of science at secondary school level.

Hypothesis No: 4: There is any direct relationship between effective learning and Bloom's taxonomy of educational objectives at secondary school level.

Responses	Teachers	Total	Percentage
Strongly agree	130+127+93+97+138+129	714	119.00
Agree	137+137+97+103+125+118	717	119.50
Un decided	88+76+86+94+87+97	528	88.00
Strongly disagree	79+70+127+111+81+78	546	91.00
Disagree	74+98+105+103+77+86	543	90.50

Step No 1: Null hypothesis and alternative hypothesis:

H_o= There is no any direct relationship between effective learning and Bloom's taxonomy of educational objectives at secondary school level.

H_1 = There is any direct relationship between effective learning and Bloom's taxonomy of educational objectives at secondary school level.

Step No 2: Level of significance
X = 0.05

Step No 3: Test statistics to be used

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

		S.A	A	U.D	S.D.A	D.A
Observed (F_o)	Frequency	119.00	119.50	88.00	91.00	90.50
Expected (F_e)	Frequency	101.60	101.60	101.60	101.60	101.60

The calculation of $(F_o - F_e)$ for each category

17.4017.90-13.60-10.60-11.10

The calculation of $(F_o - F_e)^2$ for each category

302.76320.41184.96112.36123.21

The calculation of $\frac{(F_o - F_e)^2}{F_e}$ for each category

X^2 =2.979921259, 3.153641732, 1.82047244, 1.105905511, 1.21269685

The summation of all these $\frac{(F_o - F_e)^2}{F_e}$ will give the Chi–Square

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

X^2 =2.979921259 + 3.153641732 + 1.82047244 + 1.105905511 + 1.21269685
X^2 =10.27263779
Chi – Square = 10.27263779

Step No 4: Critical value and degree of freedom

Degree of freedom (df) = (r-1) (c-1)

(df) = (5-1) (2-1)
(df) = (4) (1)
(df) = 4

Step No 5: Compare the computed Chi-Square value to the tabulated Chi-Square value

If computed Chi-Square calculated value is greater than the tabulated value, reject Null hypothesis (H_o) otherwise accept

(H_o)
X^2 = Cal > Tab

$X^2 = 10.272 > 9.488$

Step No 6: Decision: hence that the tabulated value of Chi-Square at 4 degree of freedom is 9.488, hence the calculated value of Chi-Square is greater to a value of 9.488 which is the significant value of Chi-Square to reject the null hypothesis at 0.05 and conclude that There is any direct relationship between effective learning and Bloom's taxonomy of educational objectives at secondary school level.

Hypothesis No: 5 Bloom's taxonomy of educational objectives is helpful in promoting the ability of problem solving and creativity among science students at secondary school level.

Responses	Teachers	Total	Percentage
Strongly agree	98+89+83+85+120+102	577	96.16
Agree	113+117+117+113+135+95	690	115.00
Un decided	77+98+104+108+92+108	587	97.83
Strongly disagree	101+125+110+100+97+96	629	104.83
Disagree	119+79+94+102+64+107	565	94.16

Step No 1: Null hypothesis and alternative hypothesis:

H_o= Bloom's taxonomy of educational objectives is not helpful in promoting the ability of problem solving and creativity among science students at secondary school level.

H_1 = Bloom's taxonomy of educational objectives is helpful in promoting the ability of problem solving and creativity among science students at secondary school level.

Step No 2: Level of significance:
X = 0.05

Step No 3: Test statistics to be used

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

	S.A	A	U.D	S.D.A	D.A
Observed Frequency (F_o)	96.16	115.00	97.83	104.83	94.16
Expected Frequency (F_e)	101.60	101.60	101.60	101.60	101.60

The calculation of $(F_o - F_e)$ for each category

-5.4413.40-3.77-3.23-6.77
The calculation of $(F_o - F_e)^2$ for each category

29.5936179.5614.212910.432945.8329

The calculation of $\frac{(F_o - F_e)^2}{F_e}$ for each category

X^2 =0.29127559, 1.767322834, 0.13989.748, 0.10286.23, 0.45111122

The summation of all these $\frac{(F_o - F_e)^2}{F_e}$ will give the Chi–Square

$$X^2 = \Sigma \frac{(F_o - F_e)^2}{F_e}$$

X^2 =0.29127559 + 1.767322834 + 0.13989.748 + 0.10286.23 + 0.45111122

X^2 =2.752460622
Chi – Square = 2.752460622

Step No 4: Critical value and degree of freedom

Degree of freedom (df) = (r-1) (c-1)

(df) = (5-1) (2-1)
(df) = (4) (1)
(df) = 4

Step No 5: Compare the computed Chi-Square value to the tabulated Chi-Square value: If computed Chi-Square calculated value is greater than the tabulated value, reject Null hypothesis (H_o) otherwise accept (H_o)

$X^2 = Cal < Tab$
$X^2 = 2.752 < 9.488$

Step No 6: Decision: Hence that the tabulated value of Chi-Square at 4 degree of freedom is 9.488, hence the calculated value of Chi-Square could not reach to a value of 9.488 which is the significant value of Chi-Square to accept the null hypothesis at 0.05 and conclude that Bloom's taxonomy of educational objectives is not helpful in promoting the ability of problem solving and creativity among science students at secondary school level.

Finding from Headmasters Interviews: Eight questions were used by the researcher for the headmasters after the qualitative interpretation of the responses collected from findings. It is concluded that government school teachers have some knowledge about Bloom's taxonomy of educational objectives but they are not fully clear about the Bloom's taxonomy. Headmasters of government secondary school believe that Bloom's taxonomy helps to set instructional objectives. They admitted more information is necessary for clear understanding of Bloom's Taxonomy and instructional objectives. Although headmasters of government secondary schools realize the significance of written lesson planning for systematic, organized and useful teaching but they admitted it is bitter fact that our teachers does not plan their teaching in written, they only focuses on oral lesson planning. Majority of headmasters accept this fact that our teachers of science in government secondary schools have not knowledge of Bloom's taxonomy of educational objectives appropriately. Although majority of teachers of science have professional qualification researcher find out this fact teachers of science have poor knowledge about the Bloom's taxonomy of educational objectives. All over government secondary school headmasters admitted clearly that their teachers do not use Bloom's taxonomy of educational objectives in the development of instructional objectives. Researcher find out that teachers do not use Bloom's taxonomy of educational objectives in the development of instructional objectives for sciences subject. Majority of government school headmasters think that Bloom's taxonomy's oriented instructional objectives do not help teachers of science when they frame lesson plan. Researcher found here that headmasters do not believe that Bloom's taxonomy oriented objectives are helpful in lesson planning.

Conclusion

Bloom's taxonomy of educational objectives in more than sixty year old but still it is considered as important for education

theory and practice in our Sindh province. Its significance seems clear from its usage in the development of curriculum, preparation of intended learning and evaluation out comes. Construction of tests, Bloom's taxonomy has huge place in teachers' education as well as process of education.

In government secondary schools most of teachers, particularly teachers of science are professionally qualified but it is very strange situation that majority of headmasters are weak in subject based knowledge about Bloom's taxonomy few faculty members of government secondary school teachers are aware about the Bloom's taxonomy of educational objectives properly. Majority headmasters accepted that they and their faculty members have not proper knowledge and understanding about the instructional objectives. Bloom's taxonomy of educational objectives is not helpful and useful in determining and writing instructional objective. The results of the study indicate that the majority teachers of science are failing to use first three levels of Bloom's taxonomy of educational objectives namely knowledge, comprehension and application while teaching sciences subjects. Few teachers of science use last three levels of Bloom's taxonomy of educational objectives namely analysis, synthesis and evaluation. Bloom's taxonomy of educational objectives is necessary for science teachers at secondary level to teach sciences subject effectively in order to develop the student's concept rather than make them able to choose rote method of learning.

Recommendation

This research assesses and evaluates the knowledge, understanding and application of the Bloom's taxonomy by teachers in sciences subject at government secondary schools of Sindh. The findings of this research will be applicable at public and private secondary schools of not only of Sindh but throughout the country.

- Bloom's taxonomy of educational objectives is valuable it should be included thoroughly in syllabus of all B.Ed. formats.
- 2.Teacher's training is essential for teachers professional development here educational authorities are advised to conduct training programs for the teachers on regular basis and the Off Campus, evening, weekly and distance education programs of teachers education should improve their quality of teaching and learning process. Along with enforcing all the conditions.
- Written lesson planning stimulate teacher for effective useful and fruitful teaching, it is recommend that daily written lesson planning for teaching any subject should be compulsory at secondary school level.
- Instructional objectives provide path for lesson planning and all the teachers should be able to understand instructional objectives properly and write accurately for this purpose authorities arrange workshops and induction training for teachers, especially for teachers of science to improve their skill of writing instructional objectives positively.
- All the teaching activities must revolve around the lesson plan.
- Teacher's lesson plan record must be maintained proper.

REFERENCES

Aggarval, J.C. 2006. Essentials of Educational Technology: Teaching learning, Innovations in Education, vikas publishing, new dehli.

Ametha, P. 2008. Methods of teaching Biological Science, Neelkamal, Hyderabad.

Bolte, C., Holbrook, J., Mamlok-Naaman, R., and Rauch, F. 2014. Science Teachers' Continuous Professional Development in Eurupe . Klagenfurt : University of Klagenfurt .

Cooper, D. 2001. Improving Saftey Culture . London : John Wiley and Sons Ltd. .

Dailey, P. R. 2003. Organisational Behaviour . Harlow : Pearson Education .

Daniel. P, shepardson 2001. Assessment in Science: A Guide to Professional Development and Class Room Practice, Kluwer Academic Publisher.

Das R.C. 2000. Teaching of chemistry, sterling publishers, New Dehli.

Das, R.C. 1996. Science teaching in schools, 2nd. ed., sterling publishers, new dehli.

Davar Monika, 2012. Teaching of science PHI learning Pvt. ltd.

Din, D. M. 2015. Book Review Inspiring the Secondary Curriculum with Techonogy: Let the Students do the Work. Turkish Online Journal of Distance Education (TOJDE), 233-237.

Easton, P. 2014. Sustaining Literaacy in Africa . Paris : UNESCO.

Faubion, J. D. 1998. Aesthetics, Method, and Epistemology . New York : The New Press .

Iiyoshi, T., and Kumar, M. V. 2008. Opening Up Education . London: The MIT Press .

Indira gandhi national open university 2000. Teaching of science, instructional planning and evaluation in science. IGNOU publication, New Dehli.

Joyce, B., and Weil, M. 2003. Models of Teaching . New Delhi : Prentice Hall of India pvt.

Kaufman, J. C., and Baer, J. 2006. Creativity and Reason in Cognitive Development. Cambridge: Cambridge University Press .

Lewis, C. W., and Gilman, S. C. 2005. The Ethics Challenge in Public Service . San Francisco : John Wiley and Sons, Inc. .

Major, J. S., Brownfeld, D. S., and Lightfoot, D. J. 2005. Learning with Professionals . Washington: Department of Defence, U.S.

Mangal S.K. and Mangal Uma 2014. Essentials of Educational Technology, PHI Learning Pvt. Ltd.

Mangal S.K. Mangal Shubhra, 2013. Research Methodology in Behavioural sciences, PHI learning Pvt. ltd.

Mangal, S.K., Teaching of Physical sciences 2005. Arya book depot, New Dehli.

Margaret Kernan, P. D. 2007. play as a Context for Early Learning and Development . National Council for Curriculm and Assessment, NCCA, 25-28.

Matsuura, K. 2009. Investing in Cultural Diversity and Intercultural Dialogue . UNESCO .

Millon, T. 2004. Personality Disorders in Modern Life . New Jersey: John Wiley and Sons, Inc. .

Mohan R. Teaching of physical science, Neelkomal Publications, New dehli.

Moore, A. 2003. Teaching and Learning . London and New York: Routledge Flamer .

Neves, C. M. 2009. Lesson for Tomorrow . Smithsonian : Smithsonian Institution .

New Testament. 2014. Salt Lake City, Utah: The Church of Jesus Christ of Latter-day Saints .

Northedge, A. 2007. The Good Study Guide . Milton Keynes : The Open University .

Porta, D. d., and Keating, M. 2008. Approaches and Methodolgoy the Social Sciences . Cambridge : Cambridge University Press .

Rajan Sanika, 2012. Methodology of Teaching Science, Dorling Kindersley (India) Pvt. ltd.

Rushby, N. (2013). The Future of Learning Technology: Some Tentatsive Predictiions . International Forum of Educational Technology and Society , 59-62.

Sharma R.C., Modern science teaching, 5th ed. , Dhanpat Rai.

Siddiqui. N.N. and siddiqui M.N., Teaching of Science, Today and Tomorrow, 5th rev. ed. Doaba House, Dehli.

Sinding, M. 2003. The Mind's Kinds: Cognitive rhetoric, Literary Genre and Menippean satire . pp. 51-60.

Skill Builder Plan. 2015. Shreve Ged Academy .

Smelser, H. H. 1992. Social Change and Modernity . Oxford : University Of California Press.

Stolovitch, H. D., Keeps, E. J., and Rodrige, D. 1999. Skill Sets, Characteristics and Values for the Human Performance Technologist . International Society for Performance Improvement .

studeies, T. U.C. 2017. The Scince of Consciousness. California .

Swain, S.K., Pradhan, C and Khatai, P.K., Educational 2009. Measurement, Statistics and guidance 2nd. Ed. Kalyani, Publishers, Ludhiana.

Timperley, H., Wilson, A., Barrar, H., and Fung, I. 2007. Teacher Professional Learning and Development . Wellington: Ministry Of Education, Wellington, New Zealand .

Trends in Higher Education Marketing, 2016. Enrollment, and Technology . Hanover Research (HR).

Vey, D. L. 2017. A Learning Environment for a Sustainable Future . pp. 3-7.

Webster, R. and Stolz, S. 2013. Measuring up in Education . Melbourne : Philosophy of Education Society of Austraila (PESA).

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