Effect of Blended and Traditional Instructional Strategies on *'Principle Schema'* in Life Science Learning at Secondary Level Students with Relation to their Learning Styles

Rajarshi Roy[1], NilimaTirkey[2]

[1]*Professor of Education, Department of Education, Vinaya Bhavana, Visva Bharati, Santiniketan, West Bengal*

[2]*Junior Research Fellow (JRF), Department of Education, Vinaya Bhavana, Visva Bharati, Santiniketan, West Bengal*

*Corresponding Author: Rajarshi Roy, Professor of Education, Department of Education, Vinaya Bhavana, Visva Bharati, Santiniketan, West Bengal.

ABSTRACT

The purpose of this study is to compare the effectiveness of blended instructional strategy and traditional instructional strategy in life science learning at secondary level students with relation to their learning styles in principle schema. 240 secondary level students of class 9th were selected for the study from Jharkhand state. Pretest posttest non-equivalent control group design has been adopted for Blended and Traditional instructional purpose for experimental and control group respectively. Achievement scores in life science learning calculated by employing t-test as statistical test. The findings reveal that Blended Instructional Strategy (BIS) is the effective method to teach and learn. The students were having learning preferences of Reflectives, and Theorist shown that the blended instructional strategy is the best way to learn the principle type knowledge. The students were having learning preferences of Actives and Pragmatist shown that the blended and traditional instructional strategies have same effect on learning the principle type knowledge.

Keywords: *Instructional strategies, Schemata of Knowledge and Principle Schema, Life-science learning*

INTRODUCTION

In the learning process, instructions given by the teacher shapes the mental ability and development of the learners. The teacher has to make a careful connection of learning methods and strategies to meet the learning style of each learner. Teaching learning process is an important aspect of education. When talking about the teaching and learning process, three questions essentially came in mind: *what to teach, how to teach,* (*Merrill, D.M., 2001, p.5*) and *whom to teach?* What to teach regarding the content given to the learner. How to teach concerns with the appropriate strategy suitable to the learner. The third question *'Whom to teach'* resembles the type of learner based on their learning preferences.

Instructional strategy is a process or manner by which an instruction module, instruction phase or an entire course is delivered and which may include one or more methodologies such as conference, demonstration, discussion, lecture, heuristics, etc. The traditional teaching is the old method of teaching. The traditional teaching strategies are generally teacher-directed and follow cookbook steps of activities such as lecture method and demonstrations. In modern trend the different methods of teaching has been evolved for efficient learning, so blending of these methods and techniques is felt essential. The blend is a mix of a substance with another substance so that they combine together, or mix different types of the same substance together so as to make a product of the desired quality. In this sense blended instruction came into consideration for quality output in education. *Graham, Allen and Ure* (2003 *as cited by Bonk, bC. J. and Graham, C.R.*) defined blended instruction as a combination of instructional modalities (or delivery media), a combination of instructional methods and a combination of online and offline instruction. Experimental studies conducted by *Jadhav, K.D. (2013), Orly C., Amy, P., and Liz, C. (2012). Roya, S., Mehdi, S., and Faramarz, S.A. (2014), Moazamil, F.Bahrampour, E.Md. Azar, R., Jahedi, F. and Moattari, M.(2014)., Giannousi, M.,Vernadakis,*

N.Antoniou, P., and Kioumortzoglou, E.(2014) reveals that students performed better with technology assisted and/ or blended instruction than traditional instructional strategies. It shows effectiveness of blended instructional strategy on traditional instructional strategy.

According to *D. E. Rumelhart (1980, p.33)* schemata are the building blocks of cognition, fundamental elements upon which all information processing depends. A schema is a data structure for representing the generic concepts stored in memory and underlying knowledge concepts are objects, situation, events, sequences of events, actions and sequences of actions *(p.34)*. The meaning of schemata is a diagram, plan or scheme. According to *Joshi, and Salunke (2006 p.132)* the collective set or frame of interrelated concepts is called schemata. Schema is a group or organization of interrelated concepts that are meaningfully associated with a main concept. *Romiszowski, A.J. (1984)* for constructive instructional design focuses on approach to topic analysis and stating the cognitive objectives suggested by Williams. There are four types of information or categories of knowledge – *facts, procedures, concepts and principles*. The four basic types of knowledge illustrate several aspects of knowledge presented in systematic form thus called as 'knowledge schemata'.

According to schema theory the learning involves the creation of new schemata. This involves the actual development of new concepts. In schema theory there are two ways in which concept can be generated the one way is patterned on existing schema or they can be induced from experience.

Apart learning styles and learning are as important as intellectual ability. Learning styles are directly related to how students achieve in school. Learners are flexible in their use of different learning styles and can adapt with varying degrees of success to different learning situations (*Sternberg, R.*1990). In life-science, concepts can be grasped by observation, experimentation, analysing, synthesising, knowing and applying the facts in real life situation and learner prefer learning differentially in different learning situations. So, learning styles of the learner in Life-science also taken important consideration in this study.

REVIEW OF RELATED RESEARCH LITERATURE

Since quite some time, researchers in the arena of instruction are attracted over the very dimension and across globe, good many studies have already been conducted on the very domain, relating allied areas of instruction. The researchers tried to explore those studies prior to undertake the present one. The outcomes of related studies, which are having direct bearing with the present study, are presented as follows:

STUDIES ON DIFFERENT INSTRUCTIONAL STRATEGIES AND LEARNING STYLES

Experimental studies conducted by *Jadhav, K.D. (2013), Orly C., Amy, P., and Liz, C. (2012). Roya, S., Mehdi, S., Faramarz, S.A. (2014), Moazamil, F.Bahrampour, E.Md. Azar, R., Jahedi, F., and Moattari, M.(2014)., Giannousi, M.,Vernadakis, N.Antoniou, P.,* and *Kioumortzoglou, E.(2014)* reveals that students performed better with technology-assisted or blended instruction, compared to traditional instructional strategies. It shows effectiveness of blended instructional strategy on traditional instructional strategy. One of the studies by *Omer D. (2011)* indicated that learners were more engaged with problem based blended learning environment. The students' interaction and the level of academic challenge perceived were similar in both instructional strategies. It indicates that both the instructional strategies create some problem in maximizing learning. So, the educator or instructor should teach in the very way that the learner can learn the whole content in an easy way. Other studies by *Erdem M., and Kabir P. N. (2014) & Anna Ya Ni (2012)* explored that face-to-face environment or traditional instructional strategy gained highest score than blended instructional strategy.

Studies carried out by *Mary, L. W. (2011) , Erika, J. R. (2005) , Seevrinda, N. N.(2012) ,Lori, A.W. (1988) , Shenoy, N. et al.(2013), Ikitde, G. A. and Bassey, E.U. (2013), Akinbobola, A.O. (2015) , Tulbure, C. (2001)*showednumerous conclusions regarding learning style and learning. Some resulted that learning styles as a factor influencing group development. Some observed that there is a relationship between student perceived classroom environment and instructor's teaching style by components of personality type. Some study showed that the subjects had a higher

preference for multimodal learning, if biology students taught with guided inquiry teaching strategy in consideration of learning styles it will significantly affect the academic achievement, explored that guided discovery is the most effective instructional strategy for physics students with sensing/ intuitive learning style, demonstration is the most effective with sequential/global learning style and conventional strategy is the most effective with visual/verbal learning style. Some studies reflected that different learning styles achieve better academic scores when teaching strategies respond to their learning preferences.

The study carried out by the *Frick, T.W., Koh, J.H.L. and Chadha, R.* as cited in *Roy, R. (2011)* the First Principles of Instructions by *Merrill M. D.* found the effective teaching strategy with online.

Study carried out by *Tirkey, N., and Roy, R., (2017)* to explore the impact of traditional instructional strategies and blended instructional strategies in life science in relation to various learning styles (*Actives, Reflectives, Theorist, Pragmatist*) of learners based on *Honey* and *Mumford*.120 students from class IX[th]in Jharkhand following a random sampling method selected for the study. The data analyzed with SPSS with statistical technique Mean and t-test. The findings reveal that the learners possessing Reflective, Active, and Pragmatist type of learning style perform better if taught following blended strategies compared to the identical groups when taught through traditional strategies. The theorist type learner not affected with different instructional strategies whether it is blended or traditional.

STUDIES ON DIFFERENT INSTRUCTIONAL STRATEGIES AND KNOWLEDGE SCHEMA

Jitendra, K. A., Star, R. J., Rodriguez, M., Lindell, M., Someki, F. (2011) investigated the effectiveness of schema based instructional program in the mathematic subject to solve the problems like ratios/ rates, scale drawing and percents to teach 7th grade students. For this study pretest- intervention-postest design with a retention test used 283 participants assigned randomly in SBI classroom and in control group situation assigned 153 participants. The study shows that SBI is an effective approach for improving students' proportional problem-solving performance. Schematic presentation solve problems promote understanding of

mathematical ideas. It also promotes conceptual understanding of the problem. Another study by *Jitendra, K. A., Star, R. J. (2012)* explores that whether the schema-based instruction improve the high and low achieving students' learning in 7th grade students were selected for the study. The high achievers had greater impact on problem solving and for low achievers the new implications have been generalized to do best. The low achievers need long time to understand the concept as well as flexible and multiple way of learning.

Study carried out by *Gurlitt, J., Dummel,S., Schuster,S., and Nuckles, M., (2012)* investigated that does specific structure of advance organizers influence learning outcomes? In the first experiment, 48 psychology students were randomly assigned to three differently structured advance organizers: a well-structured, a well-structured and key-concept emphasizing, and a less structured advance organizer. These were followed by a sorting task, a text study phase, and a posttest. Data were analyzed by applying ANOVA. The results indicated that differently structured advance organizers lead to different proto-schemata before and different learning outcomes after the text study phase. The second experiment replicated and extended these findings with 53 mathematics students. The results showed strong beneficial effects of well-structured advance organizers. Both experiments supported that the structure of advance organizers has an effect on preliminary schemata and learning outcomes. On a general level, the results indicate that advance organizers can support the generation of proto-schemata and thus can be more than the activation of "existing" concepts in long-term memory.

Study carried out by *Tirkey, N. & Roy, R. (2018)* to compare the effectiveness of blended instructional strategy and traditional instructional strategy in Life science at secondary level students with relation to their learning styles in Fact Schema. 240 class-9th students were selected for the study. Pretest-posttest non-equivalent control group design has been adopted for blended and traditional instructional purpose for experimental and control group respectively. The findings reveal that the students having learning preference of Active, Reflective and Theorist shown that the blended instructional strategy is the best way to

learn the factual knowledge but the pragmatists learner not gained efficiently in compare to these students.

The same study carried out for Procedure Schema by *Tirkey, N. & Roy, R. (2018)* the findings reveal that the students having learning preference of Active, Reflective, Theorists and Pragmatists shown that the blended instructional strategy is the best way to learn the procedural knowledge.

The same study carried out for Concept Schema by *Tirkey, N. & Roy, R. (2019)* the findings reveal that the students having learning preference of Active, Reflective and Theorist shown that the blended instructional strategy is the best way to learn the conceptual knowledge but the pragmatists learner not gained efficiently in compare to these students.

So, the question may arise that whether the efficient learning accomplish by course content organized according to knowledge schema i. e principle-based knowledge with instructional strategy and learning style? In search of this thirst area the researchers formulated the following objectives.

OBJECTIVES OF THE STUDY

The main objective of the study is to compare the effect of blended and traditional instructional strategies with relation to their learning styles (Actives, Reflectives, Theorists, and Pragmatists) on principle *schema* in Life Science learning

To achieve the main objective four sub objectives have been formulated which were as follows

- To compare the effect of blended and traditional instructional strategies with relation to their Active learning style on *principle schema*.
- To compare the effect of blended and traditional instructional strategies with relation to their Reflective learning style on *principle schema*.
- To compare the effect of blended and traditional instructional strategies with relation to their Theorist learning style on *principle schema*.
- To compare the effect of blended and traditional instructional strategies with relation to their Pragmatist learning style on *principle schema*.

HYPOTHESES

For testing four subsequent hypothesis were formulated given below

H1a- There is no difference in the effect of blended and traditional instructional strategies with relation to their Active learning style on *principle schema*.

H1b- There is no difference in the effect of blended and traditional instructional strategies with relation to their Reflective learning style on *principle schema*.

H1c- There is no difference in the effect of blended and traditional instructional strategies with relation to their Theorist learning style on *principle schema*.

H1d- There is no difference in the effect of blended and traditional instructional strategies with relation to their Pragmatist learning style on *principle schema*.

OPERATIONAL DEFINITION

Effect- In the present study effect is the measure of the achievement when using blended and traditional instructional strategy.

Instructional Strategy- In this study instructional strategy refers to plan or activity to deliver the content through stated method of instruction for achieving the set objectives.

Blended Instructional Strategy- For this study the blended instructional strategy is the use of combination of various pedagogical approaches (e.g., constructivism, behaviourism, cognitivism) and theories to produce an optimal learning outcome with or without instructional technology based on First Principle of instruction by *Merrill, D.* for content delivery. *First Principles of Instruction by D. Merrill* given emphasis as it comprises of five fundamental principles of effective instruction. The principles are *Task centered principle, Activation principle, Demonstration principle, Application principle and Integration principle (Roy, R. 2011 p.22).*

Traditional Instructional Strategy- In this study traditional instructional strategy refers to lecture, chalk-talk for content delivery.

Schemata of Knowledge and Principle Schema- In this study schemata of knowledge refers to four categories of knowledge i.e. *fact, procedure, concept* and *principle* on the basis of content of life science topics of class 9th. The

main emphasis in the study given to the principle type knowledge. According to *Romiszowski, A. J. (1984 pp. 41- 45)* Principles are the rules that guide action or explain change. This again subdivided in 3 forms

Principles of Nature: all principles or laws that we can see to be in operation in the world around us. The rules that govern the behaviour of our environment.

Principles of Action: Such type of knowledge which any one use to solve out the particular problem in a specific situation, emphasis on the particular action or reaction which individuals can applies to a particular situation.

Rule System: It concerns with theories and strategies. Discrete but related rules combine to form rule systems. In simple terms the combination of certain observed principles of any phenomena together with the application of certain general principles might lead to the formulation of a new highly specific theory of hypothesis.

Learning Style- In this research study the learning style refers to the way i.e. *Actives, Theorists, Pragmatist and Reflectives* in which learner approaches the problem or deals with different learning situation.

Life Science- The Life science comprises the field of science that involve the scientific study of living organism such as microorganisms, plants, animals, and human beings as well as related considerations like bioethics which is mainly provided at secondary level curriculum. It is also called as biology.

Secondary Students- The secondary students referred as secondary level school students of class IX for this study.

METHOD OF THE STUDY

Research Design

The study is experimental study to compare the effect so for the study pretest-posttest non-equivalent control group design has been selected.

Sample

Four schools selected from Ranchi (Jharkhand). 240 samples from the secondary level students of 9th class randomly assigned for experimental and control group from four schools. Two schools from JAC Board and Two Schools from CBSE Board has been taken. From each four schools two sections of class 9th students taken. One section randomly assigned as experimental and other as control group.

Procedure

The researchers administered the Learning-Style inventory deduced by *Honey and Mumford* (1986) to classify the learner for experimental and control group into their preferred learning style. Researchers also administered pretest before giving the treatment in experimental group and also in control group and administered post achievement test on the basis of content knowledge. In experimental and control group the researcher taught with blended and traditional method respectively.

Instructional Technique

Instructional plan on the basis of content analysis of Life Science book of class 9th of JAC Board and CBSE Board schools based on schemata of knowledge i. e. fact, concept, procedure and principle have been developed. The blended instructional strategy given by *Merrill, D.* the *First Principles of Instruction* (2002) and the content knowledge arranged to give a proper knowledge in a particular area. The three chapters from Life Science text book of class 9th i.e. 'Cell', 'Tissues' and 'Diversity in Living Organisms' selected for the purpose. The contents of the chapters were analyzed according to principle type knowledge. The experimental group was given instruction with blended instructional strategy which deals the principle type knowledge with five phases of instruction i.e. task centered phase, activation phase, demonstration phase, application phase, integration phase. In the task centered phase, the students were given some tasks which connect prior knowledge to the new knowledge for example in the cell chapter there is an activity to observe the process of Osmosis. In the activation phase on the basis of topic objective the task was given to the learners in groups to observe the phenomena of osmosis through an activity with raisins and find the other examples of osmosis performed in plants as well as in animals. The third phase was demonstration phase in which researcher demonstrate the process of osmosis with raisins to complete the task by the learners. The learners applied the

information to complete the given task where they have to find out the other examples of osmosis in plants as well as in animals, it was the application phase and they made a presentation on what they observed and what are the other examples of osmosis. Likewise, the other principle such as diffusion, principles of binomial nomenclature, principle based on which desert plants have *thick cuticle* etc. were explained. The traditional group of the learners was given the lecture on the principle type knowledge.

Measuring Tools

The following measuring tools were used for the study were

(1) The standardized Learning Style inventory by *Honey and Mumford* (1986)

(2) Self-developed Life-science Achievement Test based on content knowledge of Life science book of IX[th]standard consist the chapters Cell, Tissues and Diversity in living organisms. The questions measure the principle-based content knowledge of the related topics.

Statistical Techniques and Analysis of Data

The collected data were analyzed quantitatively. Mean, Standard Deviation, t-test have been used to test significance of difference between the achievement of the different learning styles' students in traditional and blended instructional strategy in Life science respectively from control group and experimental group. Data were analyzed with SPSS20 software.

FINDINGS OF THE STUDY

Findings of the study based on formulated objectives and hypothesis stated under this content area, is mainly to compare the effect of blended and traditional instructional strategies with relation to their learning style i.e. Actives, Reflectives, Theorists and Pragmatists on *principle schema*. The hypothesis states, that there is no significant difference between achievement of traditional instructional strategies and blended instructional strategies in life science in relation to various learning styles of learners based on *Honey* and *Mumford*. To conclude the main hypothesis the four null hypotheses tested and analyzed data is presented in the following tables.

Table1. *Represents the no. of students and their percentage of different learning preferences*

Learning styles of the learner	No. of students in BIS & TIS group		Total no. of students	%
	BIS	TIS	61	25.42
Actives	31	30	57	23.75
Reflectives	28	29	59	24.58
Theorists	31	28	63	26.25
Pragmatists	30	33	240	100
Total students	120	120		

Total no. of students 240 selected following multistage sampling out of 120 grouped for Blended instructional strategy (BIS) and 120 grouped for Traditional instructional strategy (TIS). Out 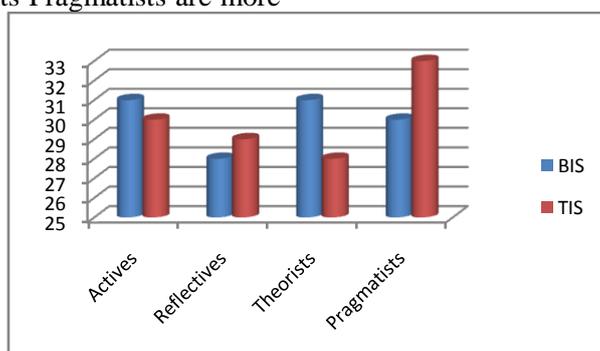of 240 students Pragmatists are more in numbers 26.25% of the total, Actives are 25.42% of the total, Theorists are 24.58% of the total and Reflectives are 23.75% of the total students.

Graph1. *Represents the no. of students in Actives, Reflectives, Theorists and Pragmatist in Blended (BIS) and Traditional (TIS) instructional strategy group*

Objective1. To compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to their learning styles.

Hypothesis1. There is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to their learning style.

To achieve the main objective i.e. to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to their learning styles, four objectives with four hypotheses to be accomplish with reference to learning styles such as Actives, Reflectives, Theorists and Pragmatists these are as follows

Objective1a. To compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Actives learning styles.

Hypothesis1a. There is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Actives learning styles.

COMPARISION OF BLENDED INSTRUCTIONAL STRATEGIES AND TRADITIONAL INSTRUCTIONAL STRATEGIES OF ACTIVES LEARNING STYLE PREFERENCE GROUP ON PRINCIPLE SCHEMA

The objective was to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Active learning style.

The data were analyzed with the help of t- test and the results are given in Table 2

Table2. *Blended (BIS) and Traditional instructional strategies (TIS) wise M, SD, N, df and t values of Actives learning style preference group on principle schema*

Groups	N	Mean	SD	SEM	Mean Diff.	SED	Df	t	Sig. (2-tailed)
Actives BIS	31	4.16	2.28	.41	.2	.59	59	.33	.74
Actives TIS	30	3.97	2.34	.43					

Table represents *t* = 0.33at *p*= 0.74 indicates there is a non-significant difference between mean achievement score of life science students of experimental (BIS) and control (TIS) group of Active learning style preference on *principle schema*.Thus, the null hypothesis that there is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with Active learning style preference is not rejected.Further the mean achievement score of Active experimental group (*M* = 4.16, *SD* =2.28) and of Active control group (*M* =3.97, *SD* =2.34) shows that the Active learners gain mean achievements scores in blended instructional strategy and Active learners in traditional instructional strategy on *principle schema*at same extent.

Objective1b. To compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Reflective learning style.

Hypothesis1b. There is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Reflective learning style.

COMPARISION OF BLENDED INSTRUCTIONAL STRATEGIES AND TRADITIONAL INSTRUCTIONAL STRATEGIES OF REFLECTIVES LEARNING STYLE PREFERENCE GROUP ON PRINCIPLE SCHEMA

The objective was to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Reflectives learning style.

The data were analyzed with the help of t- test and the results are given in Table 3.

Table3. *Blended (BIS) and Traditional instructional strategies (TIS) wise M, SD, N, df and t values of Reflectives learning style preference group on principle schema*

Groups	N	Mean	SD	SEM	Mean Diff.	SED	Df	T	Sig. (2-tailed)
Reflectives BIS	28	4.39	2.46	.46	1.53	.57	55	2.71	.01
Reflectives TIS	29	2.86	1.77	.33					

Table represents *t* = 2.71at *p*=0.01 indicates there is a significant difference between mean

achievement score of life science students of experimental (BIS) and control (TIS) group of

Reflective learning style preference on *principle schema*.Thus the null hypothesis that there is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with Reflective learning style preference is rejected.Further the mean achievement score of Reflective experimental group (*M* = 4.39, *SD* =2.46) and of Reflective control group (*M* =2.86, *SD* =1.77) shows clearly that the Reflective learners gain high achievements in blended instructional strategy than Reflective learners in traditional instructional strategy on *principle schema*.

Objective1c. To compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Theorist learning style.

Table4. *Blended (BIS) and Traditional instructional strategies (TIS) wise M, SD, N, df and t values of Theorist learning style preference group on principle schema*

Groups	N	Mean	SD	SEM	Mean Diff.	SED	Df	T	Sig. (2-tailed)
Theorist BIS	31	4.61	2.29	.41	1.36	.48	57	2.86	.01
Theorist TIS	28	3.25	1.11	.21					

Table represents *t* = 2.86at *p*=0.01 indicates there is a significant difference between mean achievement score of life science students of experimental (BIS) and control (TIS) group of Theoristlearning style preference on *principle schema*.Thus the null hypothesis that there is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with Theorist learning style preference is rejected.Further the mean achievement score of Theorist experimental group (*M* = 4.61, *SD* =2.29) and of Theorist control group (*M* =3.25, *SD* =1.11) shows that the Theorist learners gain high achievements in blended instructional strategy than Theorist learners in traditional instructional strategy on *principle schema*.

Objective1d. To compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Pragmatist learning style.

Hypothesis1c. There is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Theorist learning style.

COMPARISION OF BLENDED INSTRUCTIONAL STRATEGIES AND TRADITIONAL INSTRUCTIONAL STRATEGIES OF THEORIST LEARNING STYLE GROUP ON PRINCIPLE SCHEMA

The objective was to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Theorist learning style.

The data were analyzed with the help of t- test and the results are given in Table 4.

Hypothesis1d. There is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Pragmatist learning style.

COMPARISION OF BLENDED INSTRUCTIONAL STRATEGIES AND TRADITIONAL INSTRUCTIONAL STRATEGIES OF PRAGMATIST LEARNING STYLE PREFERENCE GROUP ON PRINCIPLE SCHEMA

The objective was to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to pragmatist learning sty

The data were analyzed with the help of t- test and the results are given in Table 5

Table5. *Blended (BIS) and Traditional instructional strategies (TIS) wise M, SD, N, df and t values of Pragmatist learning style preference group on principle schema*

Groups	N	Mean	SD	SEM	Mean Diff.	SED	Df	T	Sig. (2-tailed)
Pragmatist BIS	30	4.40	2.62	.48	.82	.58	61	1.42	.16
Pragmatist TIS	33	3.58	1.99	.35					

Table represents *t* =1.42at *p*=0.16 indicates there is a non-significant difference between

mean achievement score of life science students of experimental (BIS) and control (TIS) group

of Pragmatist learning stylepreference on *principle schema*. Thus the null hypothesis that there is no significant difference in the effectiveness of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with Pragmatist learning style preference is not rejected. Further the mean achievement score of Pragmatist experimental group (*M* =4.40, *SD* =2.62) and of Pragmatist control group (*M* =3.58, *SD* =1.99) shows that the Pragmatist learners gain achievements at same extent in blended and traditional instructional strategies on *principle schema*.

DISCUSSION

The first objective of the study was to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Actives learning styles.The result shows that the Active learners gain mean achievements scores in blended instructional strategy and in traditional instructional strategy on *principle schema*at same extent.

The second objective of the study was to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Reflective learning style.The result shows clearly that the Reflective learners gain high achievements in blended instructional strategy than Reflective learners in traditional instructional strategy on *principle schema*.

The third objective of the study was to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Theorist learning style. The result shows that the Theorist learners gain high achievements in blended instructional strategy than Theorist learners in traditional instructional strategy on *principle schema*.

The fourth objective of the study was to compare the effect of Blended and Traditional instructional strategies on *principle schema* in Life Science among the secondary students with reference to Pragmatist learning style.Result reveals that the Pragmatist learners gain achievements at same extent in blended and traditional instructional strategies on *principle schema*.

In the present study knowledge schemata, the knowledge structure in the form of principle

found essential organization for effective teaching. Study by *F. Diggorry* (1994) represents that knowledge bases can be taught within behavior development or apprenticeship instructional model.

The result reveals that in gaining the principle type knowledgethe two types of learner i.e. reflectives and theorists perform better in blended instructional strategy. But the actives and pragmatists gain the principle type knowledge in both the instructional strategy at same extent.

CONCLUSION

The study reflected that Blended Instructional Strategycan be better strategy of teaching. It is an effective way to deliver the content. Very often the learners learn the principle type knowledge in text form or reasoning form but this strategy makes the learner well versed with the principle type knowledge by implementing five steps of Blended Instructional Strategy (i.e. task, activation, demonstration, application and integration) given by Merrill, D. In a diversified learning situation where learners having different learning preferences such as Actives, Reflectives, Theorists and Pragmatists, the study reveals that Reflectives and Theorists gained the principle type knowledge better with Blended Instructional Strategy. Actives and Pragmatists of Blended and Traditional groups have same extent of learning. Therefore, teachers should also take into consideration the type of learners. Result explores that Blended Instructional Strategy is an effective method of teachingand along with this instructional strategythe learner's learning preferences as well as content knowledge also needsproper consideration for efficient learning.

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