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## RESEARCH ARTICLE

### PRSE - CYCLICAL LEARNING STYLES AND STAGES BASED ON THE RESEARCH OF KURT LEWIN, DAVID KOLB, JOHN DEWEY, JEAN PIAGET.

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#### Abstract

The research thesis of this study is that matching students' learning style preferences with the complementary course syllabus and instruction improved academic achievement and student attitudes toward learning based on the research work of Kurt Lewin, David Kolb, John Dewey, Jean Piaget. The composition of this study method is both descriptive and exploratory. In the first part of the study, the qualitative research method was used to overview the literature background of the study. In the empirical part of the study, the factor analysis, using the Principle Axes Factoring method – PAF, was used to extract learning styles.

This study has four aspects. First, it outlines the literature review, summarizing learning styles taxonomy. Then it covers research framework and methodology, including data collection, sample characteristics, variables description and data analysis and tests the learning styles theories using factor analysis. Finally, it discusses the results by recognizing some limitations and by providing pedagogical implications and further research.

This article explains the cyclical learning styles like participating, reflecting, structuring and experimenting, based on the combined research work of many notable researchers. The concept of learning styles is embedded in different academic literature and researched from different approaches, including intelligent learning systems (Laureano-Cruces et al., 2006), a genetic algorithm approach to students' learning styles (Yannibelli et al., 2006), a web-based education perspective on learning styles (Garcia et al., 2007), learning about and through aesthetic experience (Welsh et al., 2007), use of business case studies in the learning process (Duff et al., 2008), problem-solving strategies within learning styles (Metallidou & Platsidou, 2008), preferred learning styles (Peters et al., 2008) and an adaptive learning system perspective of learning styles (Tseng et al., 2008).

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## Introduction:-

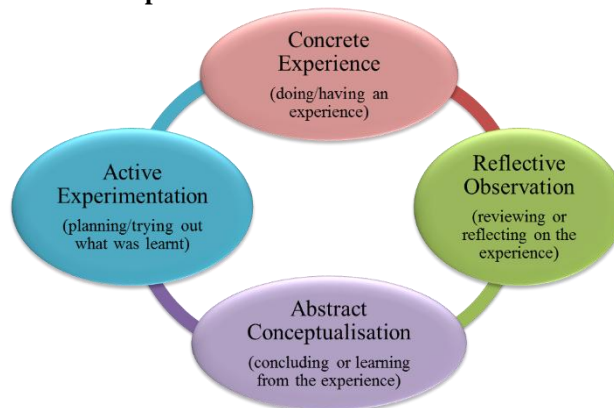


**David Kolb.**

Born 1939, he is an American educational theorist. He is the founder-chairman of Experience Based Learning Systems, Inc. (EBLS) whose interests and publications focus on:

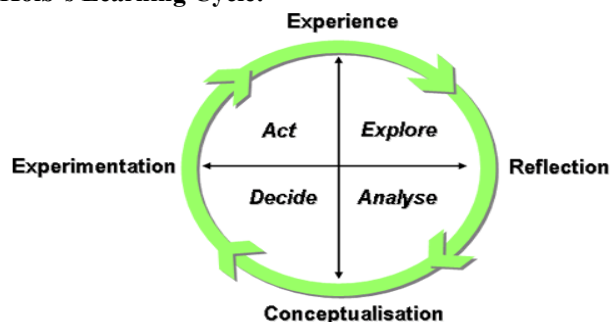
- experiential learning,
- the individual and social change, career development
- executive and professional education

**David Kolb (1984)** said that (deeper) learning runs through a cycle of **concrete experience, reflective observation, abstract conceptualization** and **active experimentation**.



Applying lessons learned into future actions provides the basis for another cycle of learning.

## Kolb's Learning Cycle:-



- The left side of the vertical arrow represents **doing tasks**, the right side **observing tasks**.
- The upper half represents **feeling** (being creative and emotional), the bottom (logical) **thinking**.

- People usually have their own preferences in one of the four learning styles: they are more **exploring**, **analyzing**, **decision-making** or **acting** types.

A well-balanced team consists of people with different learning styles.

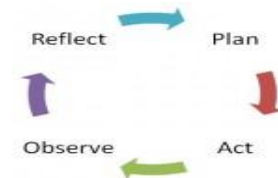


**Kurt Lewin**

**Kurt Lewin**, whom many consider to be the **father of modern social psychology** and the **study of organisational behaviour**, developed a four-stage model of action-research.

This model has been adapted by many others, the most notable of whom is David Kolb. The cycle starts when an individual encounters a problem within the environment. Then,

1. **Reflect** on what they know about situations like this.
2. **Plan** how they intend to proceed.
3. **Act** out their plan.
4. **Observe** the results their actions bring.

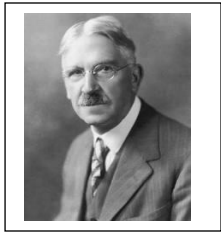


**Jean Piaget**

Swiss biologist and psychologist **Jean Piaget (1896-1980)** is renowned for constructing a highly influential model of child development and learning.

The concept of **cognitive structure** is central to his theory. Cognitive structures are patterns of physical or mental action that underlie specific acts of **intelligence** and correspond to stages of child development. There are 4 **primary cognitive structures** (i.e., development stages) according to Piaget:





**John Dewey**

**John Dewey** (October 20, 1859 – June 1, 1952) was an American philosopher, psychologist and educational reformer whose ideas have been influential in education and social reform.

Dewey was an important early developer of the philosophy of pragmatism and one of the **founders of functional psychology**. He proposed that education be designed on the basis of a TOE - **theory of experience**.

#### Central Tenets Of Dewey's Theory:-

Dewey's theory of experience rested on two central tenets:-

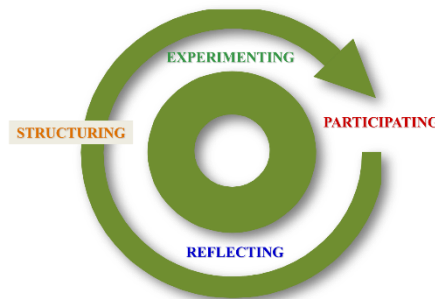


**Continuity** refers to the notion that humans are sensitive to (or are affected by) experience.

Humans survive more by learning from experience after they are born than do many other animals who rely primarily on pre-wired instinct.

**Interaction** builds upon the notion of continuity and explains how past experience interacts with the present situation, to create one's present experience.

#### Cyclical Learning Styles:-



#### Learning Is Cyclical In Nature - Kurt Lewin, David Kolb, John Dewey, Jean Piaget:-

Learners are **actively involved** (participating) in some form of learning event. They **reflect** back on the activity - either alone or in consultation with others, to develop an understanding of what they've **experienced**. They understand based on their **Participation** and **Reflection**. This helps them develop a generalized set of theories or rules (**Structuring**) of how things should work.

They **experiment** the theories to assess their validity that may help identify the **most practical approach** to achieving the desired results. Now, learners **participate** in a new learning 'event', repeating the experiential learning cycle once again.

The learning styles literature has had a revival during the past years, especially in the first decade of the 21st century (Alban & Metcalfe 2002; Duff & Duffy, 2002; Dunn & Griggs, 2003; Loo, 2004). Since 2007 and 2008, there has been an increasing interest in the potential of experiential learning (Reynolds & Vince, 2007; Argyris, 2007; Welsh

et al., 2007; Hornyak et al., 2007; Herbert & Stenfors, 2007; Hyde, 2007; Kayes, 2007 and Armstrong & Mahmud, 2008).

The Learning Style Questionnaire (PRSE) has been proposed as an alternative for Kolb's Experiential Learning Style Model (ELM). The PRSE is designed to probe the relative strengths of four different learning styles: Participator, Reflector, Structure and Experimenter. The authors' intention is that learners should become proficient in all four stages of the learning cycle. The authors are keen to emphasize that 'no single style has an overwhelming advantage over any other. Each has strengths and weaknesses, but the strengths may be especially important in one situation, but not in another'. These four styles correspond approximately to those suggested by Kolb's (1999) Experiential Learning Model (ELM): active experimentation (Participator), reflective observation (Reflector), abstract conceptualization (Structure), and concrete experience (Experimenter).

**Participators** involve themselves fully and without bias in new experiences. They are open-minded, not skeptical, and this tends to make them enthusiastic about anything new. Their philosophy is "I'll try anything once". They tend to act first and consider the consequences afterwards. Their days are filled with action. They tackle problems by brainstorming. As soon as the excitement from one action has died down, they are busy looking for the next. They tend to thrive on the challenge of new experiences but are bored with implementation and longer term consolidation.

- Flexible
- Gets bored with consolidation
- Happy to give things a try
- Open-minded
- Optimistic about change
- Rushes into action without preparation
- Takes immediate obvious action
- Takes unnecessary risks

**Reflectors** like to stand back to ponder experiences and observe them from many different perspectives. They collect data, both first hand and from others, and prefer to think about it thoroughly before coming to any conclusion. The thorough collection and analysis of data about experiences and events is what counts so they tend to postpone reaching definitive conclusions for as long as possible. Their philosophy is to be cautious. They are thoughtful people who like to consider all possible angles and implications before making a move.

- Careful
- Good listener
- Holds back from participation
- Methodical
- Does not jump to conclusions
- Slow to decide
- Thorough and thoughtful

**Structures** adapt and integrate observations into complex but logically sound theories. They think problems through in a vertical, step-by-step logical way. They assimilate disparate facts into coherent theories. They tend to be perfectionists who won't rest easy until things are tidy and fit into a rational scheme. They like to analyze and synthesize. They are keen on basic assumptions, principles, theories models and systems thinking. Their philosophy poses rationality and logic. "If it's logical, it's good". Questions they frequently ask are: "Does it make sense?" "How does this fit with that?" "What are the basic assumptions?" They tend to be analytical.

- Disciplined
- Intolerant of subjective, intuitive ideas
- Logical
- Low tolerance of uncertainty, ambiguity
- Objective
- Parental in approach
- Rational

**Experimenters** are keen on trying out ideas, theories and techniques to see if they work in practice. They positively search out new ideas and take the first opportunity to experiment with applications. They are the sort of people who come back from learning experiences brimming with new ideas that they want to try out in practice. They like to get on with things and act quickly and confidently on ideas that attract them. They are essentially practical, down-to-earth people who like making practical decisions and solving problems.

- Business-like – gets to the point
- Does not like theory
- Impatient with waffle
- Keen to test things out in practice
- Practical, down to earth, realistic
- Rejects ideas without clear application
- Task and technique focused

### **Research Methodology:-**

In this research, data were analyzed using the Statistical Package for the Social Sciences (SPSS 16.0). An alpha level of 0.05 was used as a margin of statistical significance (Coakes & Steed, 2003). The factor analysis using the Principle Axes Factoring method - PAF was used to extract learning approaches (Miller et al., 2002; Coakes & Steed, 2003). The essential purpose of factor analysis is to describe the variation among many variables in terms of a few underlying, but unobservable, random variables called factors. The underlying assumption of factor analysis is that there exists a number of unobserved latent variables (or "factors") that account for the correlations among observed variables, such that if the latent variables are partially out or held constant, the partial correlations among observed variables all become zero. In other words, the latent factors determine the values of the observed variables. One of the most frequently used techniques for factor extraction is the Principal Factor Method, where factors are extracted in such a way that each factor accounts for the maximum possible amount of the variance contained in the set of variables being factored (Miller et al., 2002).

### **Nature Of The Items:-**

All the items in the questionnaire belong to the content domain which facilitate in assessing an individual's personality type. The 20 items in the questionnaire describe multiple situations in which an individual is most likely to respond in various environments through which his personality characteristics are displayed. The items are repetitive in a way so as to track the individual's response to a certain-stimuli which best predicts his personality type across situations. The items are standardized as they are the same for every respondent with respect to the content, form and order

### **Data Collection And Sample Characteristics:-**

The study sample included 527 students chosen by random sampling. Students were anonymously interviewed using online questionnaires. This was to a certain level an exploratory research, setting a base for further research in this field.

### **Data Analysis – Factor Analysis:-**

The applicability of factor analysis was tested using the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO measure) and Bartlett's Test of Sphericity. The KMO measures the sampling adequacy which should be greater than 0.5 for a satisfactory factor analysis to proceed. The applicability criteria were the KMO measure being  $> 0.6$  and  $\chi^2$  test statistically significant (Miller et al., 2002). Another indicator of the strength of the relationship among variables is Bartlett's test of sphericity. Bartlett's test of sphericity is used to test the null hypothesis that the variables in the population correlation matrix are uncorrelated. The observed significance level is .0000. It is small enough to reject the hypothesis. It is concluded that the strength of the relationship among variables is strong.

### **Kmo And Bartlett's Test:-**

#### **Measure of factor analysis applicability PRSE learning style theory:-**

Kaiser-Meyer-Olkin measure of sampling adequacy	0.675
Approx. Chi- Square (Bartlett's test of sphericity)	259,572
Df - (Bartlett's test of sphericity)	78000
Sig. (Bartlett's test of sphericity)	0.000

### Analyses And Findings:-

The factors extracted from the group of variables were labeled reflectors (best explaining four variables Vs3, Vs6, Vs11,17), Structure (best explaining five variables Vs10, Vs4, Vs1, Vs16, Vs18), Participators (best explaining four variables Vs5, Vs9, Vs19, Vs20), and pragmatists (best explaining five variables Vs7, Vs12, Vs13, Vs14, Vs15), confirming the applicability of PRSE Learning style questionnaire.

	Raw Factors					Rescaled Factors			
	1	2	3	4		Participator	Reflector	Structure	Experimenter
Vs3	.053	.766	-.078	-.227		.053	.773	-.079	-.229
Vs6	-.193	.621	.073	.060		-.200	.645	.076	.063
Vs11	.136	.694	.110	.126		.143	.732	.116	.133
Vs10	.242	.162	.510	.072		.260	.174	.548	.077
Vs4	.087	.029	.737	.299		.080	.027	.677	.274
Vs1	.271	.145	.306	.258		.346	-.185	.390	.329
Vs5	.816	-.067	.272	.069		.806	.066	.268	.068
Vs9	.673	.117	.029	.031		.632	.110	.027	.029
Vs7	.415	-.120	.200	.296		.430	-.124	.208	.307
Vs12	.102	-.180	.011	.592		.113	-.200	.012	.636
Vs13	.336	-.054	.185	.545		.394	-.063	.217	.640
Vs15	.020	.069	.218	.611		.022	.077	.245	.686
Vs14	-.012	.195	.131	.542		.014	.223	.149	.616
Vs19	.241	.127	.031	.214		.765	.114	.291	.331
Vs17	.132	.068	.263	.365		.047	.625	.034	.035
Vs20	.085	.172	.521	.431		.753	-.052	.231	.627
Vs18	.339	-.062	.035	.131		.357	.123	.612	.271
Vs16	.427	.165	.343	.071		.211	.043	.614	.072

This rule of thumb is cited in Schneider (2003). He indicated that factor loadings greater than 0.30 or less than -0.30 are considered significant, loadings greater than 0.40 or less than -0.40 are considered more important and loadings greater than 0.50 or less than -0.50 are considered very significant.

In order to assess the reliability of compound scales (the extracted factors) measuring applied learning styles concepts, the Cronbach Alpha Coefficient was calculated for the sample as a whole.

<u>Factors</u>	<u>Cronbach Alpha</u>
Participator	0.688
Reflector	0.743
Structure	0.630
Experimenter	0.744

Cronbach's Alpha measures how well a set of items (or variables) measures a single unidimensional latent construct. Cronbach's Alpha is not a statistical test, rather it is a coefficient of reliability (or consistency) the reliability coefficient  $\alpha$  of 0.7 or higher is considered "acceptable" in most social science research situations (Coakes & Steed, 2003). As indicated, the results of factor analyses are close to satisfactory: Factors for the analysis have Cronbach Alpha values from 0.630 to 0.744. These results indicate that the extracted factors appropriately characterize the dimensionality of the data.

The aim of this study is to explore the widely used cyclical learning styles theory in Participator, Reflector, Structure, and Experimenter among the teenage student population. By analyzing the teenage student's learning approaches, typical patterns have been discovered. The research confirmed the results through qualitative meta-analysis and quantitative factor analysis. The study resulted in a clear extraction of four theoretically expected learning styles dimensions (factors – Participators, Reflectors, Structures, and Experimenters).

Recent thinking in this area suggests that unlike cognitive personality styles, learning styles can be modified to a degree through learning and training strategies. Instead of matching training to the styles of the learners, it could be

more rewarding to expose learners to a mismatched learning environment in order to help them develop a wider repertoire of coping behaviours and learning strategies. Those that can learn to use a variety of problem-solving and learning strategies, and apply them in situations that do not match with their natural learning style, may be more able to perform effectively across a wider range of situations than those who have limited stylistic versatility (Hayes & Allinson, 1996).

According to the research thesis of this study, we can summarize that matching students' learning-style preferences with the complementary course syllabus and instruction improved academic achievement and student attitudes toward learning. The mission of education is to create and disseminate knowledge to enable students' successful entry into the adult world. Teaching community need an awareness of the learning style preferences of students in order to develop and utilize effective and efficient teaching and pedagogical strategies and methods.

A significant number of researchers (Honey & Mumford, 1992; Armstrong & Mahmud, 2008) have argued that learning styles are not determined by inherited characteristics, but are developed through experience. Styles are therefore not necessarily fixed, but can change over time, even from one situation to the next. The implications regarding the learning strategies implementation in education suggest that students who are aware of a range of learning strategies are more likely to select the correct one for a particular task. The approach of the flexible learning style strategy is best suited to the case-study method of teaching. For the educators in educational institution, the challenge is to provide meta-cognitive support for students, enabling them to reflect not just on what they learn but also how and why.

The development of these new skills and knowledge requires a variety of teaching methods and learning strategies in order to match students' learning style preferences. Therefore, teachers/lecturers need an awareness of the learning style preferences of students in order to develop and utilize effective and efficient teaching and pedagogical strategies and methods. Recognizing students' learning styles allows educators to effectively lecture to a diverse population of students with different learning style preferences. Being an effective teacher implies matching individual learning style preferences among students with a collective course syllabus in teaching strategies.

#### **Limitations:-**

The most prominent deficiency of the research is that it does not recognize the dimension of time. Namely, the concept of this research is inherently static. Therefore, further analysis should focus on determining those developments - styles are not necessarily fixed, but can change over time. As well, from the methodological perspective of the research process, regarding the employment of the construct reliability, the average variance extracted and composite reliability index should be engaged too.

#### **Conclusions:-**

Researchers have pointed out that students learn effectively in a harmonic environment and by using teaching aids which match the students' learning style preferences (Li et al., 2008). The concept of the learning style has a broad meaning. In this research, it is proposed and defined as an individual's preferential focus on different types of information, the different ways of perceiving the information, and understanding the information (Li et al., 2008). The learning styles literature has had a revival during the past years, especially in the first decade of the 21st century (Alban & Metcalfe 2002; Duff & Duffy, 2002; Dunn & Griggs, 2003; Loo, 2004). Upon reviewing the literature on learning styles, the intense rate and growing interest is involved.

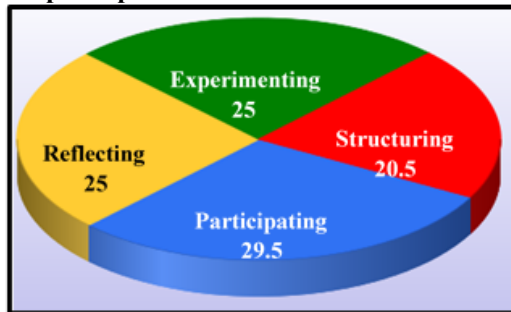
The implications for pedagogy indicate that instead of fixed learning styles strategies, adapting content to the learner, educators should rather implement flexible learning strategies. The implications regarding the learning strategies implementation in education suggests that students who are aware of a range of learning strategies are more likely to select the correct one for a particular task. The ultimate goal for the educators in educational institution is to provide meta-cognitive support for students, enabling them to reflect not just on what they learn but also how and why, thereby helping them to 'learn how to learn'.

The logic of lifelong learning suggests that students will become more motivated to learn by knowing more about their own strengths and weaknesses as learners. Consequently, if teachers can respond to individuals' learning style preferences, then the achievement rate is likely to rise and "learning to learn" skills of students may provide the foundation for the lifelong learning concept.



**Sample Report:-**

**PRSE - Participating, Reflecting, Structuring and Experimenting:** PRSE assesses the approach (Participating, Reflecting, Structuring and Experimenting) an individual takes to organize and internalize information. The individual's scores provide an objective analysis to understand the means by which he/she organizes new learning.

**Sample Report Of "A":-****Analysis:-**

- Being naturally intuitive, the subject tends to form connections between concepts easily. This allows him/her to form ideas and enhances his/her ability to address problems effectively
- The subject tends to enjoy a non-restrictive learning environment that nurtures his/her creativity and gives the opportunity to express his/her ideas/opinions/views without bias
- Often, he/she tends to use fantasy and imagination as a ready resource to facilitate learning
- Taking a holistic approach, he/she likes to gather information from various sources and seek a well- rounded understanding of a topic
- Being people oriented, he/she would work well in a team; and would benefit from learning from or teaching others. Hence, he/she would tend to reflect on his/her learning alongside others
- Seeking intellectual stimulation, he/she may tend to ask lots of 'why' questions in order to gain better clarity on the topic
- Placing importance on practical application of his/her ideas, he/she also tend to focus on honing his/her technical skills
- Being energetic and enthusiastic, he/she would be open to volunteering in an activity and learning by doing
- The use of examples would trigger his/her ability to visualize the concept and connect it with his/her previous experiences. Hence, he/she would benefit greatly with real or hypothetical examples
- He/she prefers relating learning to a personal and emotional experience, thereby, enjoy personalized attention and emotional support during a learning event
- With a need to personally experience things, he/he may enjoy learning things through self-discovery
- He/she comes across as a person who is open to new ideas, and would reflect on the same through open discussions, debates and brainstorming sessions
- He/she would be willing to take risks in order to achieve objectives and complete tasks
- He/she seeks to understand "why" things happen the way they do; hence, he/she is likely to benefit by asking questions and seeking additional information
- Driven by his/her emotions and relationships with others, he/she would be influenced by his/her teacher to a large extent. Hence, he/she would exhibit a particular interest in subjects that are taught by his/her favorite teachers

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