

Role of “Learning Styles” In “Critical Thinking” of “Senior Secondary School Students”

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Abstract

The teacher's role is quite critical in developing the critical thinking" among students. One of the major qualities that decide the effectiveness of a teaching and learning process is the learning style. The purpose of the study is to understand the role of learning styles in critical thinking. The study has used a sample size of 331 students of "senior secondary students" and a structured questionnaire was used to conduct the survey. Most of the "senior secondary school students" exhibited average level of "critical thinking", while high level of "critical thinking" is shown by the least number of "senior secondary school students" from the selected sample. The results of the study can help the instructors and teachers to understand the students learning environment in a better manner and help them in effective designing of instructional/guidance material.

Key words: Critical Thinking, Learning Styles, Senior Secondary, Students

Introduction

In India, from the period of Vedas, Upanishads the significance of education, the role of teachers in the development of student, in creation of society has been crucial. For the implementation of learning centered approach it is to be implemented at secondary and higher education level as the learners enter this phase when they are youth adults. In this phase all the mental abilities required for self learning are well developed.

Learning style is an important key factor that plays an important role in this process. Learning style describes the different ways people gather and process information .learning style is the specific way of learning of an individual. It is assumed to permit the

individual to learn in better way .It is known that people use to favor some specific way to talk and process stimuli or information.

Learning style term suggests to the opinion that individuals vary in the method for comprehension and way of study which is comparatively more effective to the individual. Backers of “learning style” evaluation, contend that the best guidance requires analyzing peoples “learning style” and altering instruction or guidance in like manner. The most widely recognized yet by all means not the only thought about the instructional significance of “learning styles” is the meshing presumption. As per meshing presumption guidance is best given in a configuration that matches the preferences of the student (e.g., for a student having preference for visual “learning style”, emphasizing visual kind of data in the instructional material) (Pashler, 2008).

As there are different inclinations for seeing and preparing data, Kolb (1984) has recommended four distinctive “learning styles”: Accommodator, Diverger, Assimilator, and Converger which are talked about underneath:

- Accommodator suggests to an individual who favors Concrete Experiencing and Active Experimentation learning measurements (i.e., an individual who likes to see data from feeling and procedure it by doing).
- Diverger suggests to an individual who favors Concrete Experiencing and Reflective Observation learning measurements (i.e., an individual who likes to see data from feeling and find out about the preparing of data by viewing).
- Converger suggests to an individual who favors Abstract Conceptualization and Active Experimentation learning measurements (i.e., an individual who wants to see data by intuition and doing).
- Assimilator suggests to an individual who lean towards Abstract Conceptualization and Reflective Observation learning measurements (i.e., an individual who likes to learn by speculation just as tuning in/viewing).

“Critical thinking” is the capacity to logically think over what to do and what to accept. It consists of the ability to engage in thought process of insightful and free reasoning.

Somebody with “critical thinking” abilities can do the following:

- Understand the consistent connections between thoughts
- Identify, build and assess arguments
- Detect irregularities and normal errors in thinking
- Solve issues efficiently
- Identify the relevance and importance of ideas

Instructors have, for a long time, seen that students prefer certain specific ways for learning in comparison to other ways. These attributes, suggests to as “learning styles”, forms a student’s one of a kind learning inclination and help educators in the arranging of small groups and individualized guidance. In the event that ideal student learning is subject on “learning styles”, and these styles change among the students, the teachers ought to know about these distinctions and adjust their course preparation and instructional techniques in like manner.

Conceptual Background

Previous literature has discussed extensively about the “learning styles” and “critical thinking”. Most of the literatures have been concentrated around students from various disciplines.

“Learning styles”

Verma (2006) in his investigation uncovered that course related contrasts happened in “learning styles” of college students. Mathews et al (1996) in their study found that preferred “learning styles” of students in the instructional design can help the learning environment quality and subsequently, results in better outcomes in learning of the students. Srivastva (2002) in her examination found that most prominent “learning styles” of the students is accommodating “learning style” and second prevalent “learning style” is convergent. Domino (1979) completed an examination on favored “learning styles” of students and found that undergrads educated in favored “learning styles” scored higher on tests, certainty information, frame of mind, and proficiency than those educated in instructional styles not the same as their favored styles and they got improved their psychological capacity.

Wehrwein et al (2007) completed an investigation on Gender Difference in Learning Style Preferences Among Under Graduate Physiology Students and found that students have

subjective learning style inclinations including visual (V; Learning from charts, outlines and stream graphs), sound-related (A; gaining from discourse), read-compose (R; gaining from perusing and composing) and sensation (K; gaining from contact, hearing, smell, taste and sight). David (2000) made an examination on “learning styles” of Gifted and Non-Gifted Secondary School Students in Hong Kong and found no critical sexual orientation contrasts were found. The finding of study proposed that more youthful age bunch students demonstrated essentially more noteworthy inclination for learning style identified with students' exercises and games than the more established age group. Despite the fact that there are characteristics of “learning style” that are very consistent in a person across various learning tasks and settings, there can still be differences in the same individual (Smith & Dalton, 2005).

Critical thinking

Willingham (2007) has characterized that “critical thinking” (just as logical reasoning and other space based reasoning) isn't ability. There are certainly not a single set of “critical thinking” skill that can be gained and conveyed in spite of the context. Second, there are meta-cognitive methodologies that, when learned, make basic reasoning almost certain. Third, the capacity to think critically (to really do what the meta-subjective systems call for) relies upon area information and practice. For instructors, the circumstance isn't odd; however nobody should discount the trouble of instructing students to think critically.

Yildirim & Özkahraman (2007) has in their study found out that it is possible to come across with various definitions of “critical thinking”. “Critical thinking” is a combination of “attitudes, knowledge and skills” that include: “Attitudes of enquiry” that involves the capability to recognize the existence of problems and the acceptance of the general need for evidence of the nature of valid abstractions and generalizations in which the weight or accuracy of various types of evidence is logically determined; the ability to use and apply the above attitudes and knowledge. Hassan and Madhum (2007) in their examination have discovered that upgrading basic reasoning aptitudes is basic to undergrad training and is in its starting stages at the University Bolstad and Hipkins (2005) found that showing approaches which bolster the advancement of students' basic reasoning abilities, and the utilization of socio logical settings

for learning, have both been upheld as fundamental and alluring bearings for optional school science instruction. Rabak (1988) has observed that outcomes, or what happens as a result of practicing “critical thinking” skills, is recursive in nature, and probably subjective. The desired outcome in reality understands the process. Content and the art of delivery in vocational and academic areas are not static; neither are other areas of life such as family and economic/historical influences.

King et al (1990) in their examination have contended that scientists or evaluators endeavoring to record the achievement of instructive endeavors intended to advance basic reasoning ought to assess the appraisal instruments they utilize or suggest as far as the fulfillment and assurance of the information claims they permit. Sabri, et.al., (2015) This investigation decides the impacts of authoritative learning society on female educator's basic considering abilities open part advanced education establishments (HEI) of the Punjab, Pakistan. The discoveries speak to that hierarchical learning society altogether influences the basic considering abilities female advanced education female instructors of Punjab. AN and YOO (2008), inspected the basic reasoning demeanors and “learning styles”, just as the connections between basic reasoning and “learning styles” of nursing understudies joined up with Baccalaureate nursing programs in Korea. There were no noteworthy contrasts in “learning styles” among grades. The degree of basic reasoning fundamentally varied among “learning styles”, and grades. Basic reasoning emphatically identified with “learning styles” and grades.

“Critical thinking” has got immense importance for students, as at this stage major development of “critical thinking” takes place. The students are exposed to school environment for the major portion of their day routine. Teachers, classroom structure, school environment and friend circle have a major role to play in the development of the student.

Summarizing the previous literature it indicates that a teacher’s role becomes quite critical in development of “critical thinking” among students. One of the major qualities that decide the effectiveness of a teaching and learning process is the learning style

Objectives

1. To assess the “critical thinking” and “learning styles” of “senior secondary school students”.
2. To study the difference in “critical thinking” of “senior secondary school students” with respect to “learning styles”.

Analysis and Interpretation

Convenience sampling technique was used to draw samples from seven senior secondary schools of Jalandhar districts of Punjab. In total, the sample was restricted to 331 “senior secondary school students” from seven senior secondary schools

Following tools were used in the present study:

1. “Critical thinking” Scale developed by “Mincemoyer, C., Perkins, D. F., & Munyua, C (2001)”.
2. Learning Style Scale ‘Index of “learning styles”’ by Thomas A. Titzinger (2007).

“Critical thinking” among “Senior Secondary School Students”

The objective was to assess the “critical thinking” of “senior secondary school students”. The “critical thinking” of the sample population was examined through the statistical techniques of Mean, Standard Deviation and Percentage. After administering the “critical thinking” Scale, the Mean and Standard Deviation of the population were calculated. The Mean of the population was 69.15 and the Standard Deviation was 11.04. Accordingly the average range of scores was found out to be at 69.15 ± 11.04 respectively. Thus, the scores less than or equal 58, 59 to 80, and greater than or equal to 81 represented low, average and high levels of “critical thinking” respectively. Percentage was calculated corresponding to the obtained number of “senior secondary school students” in each level of “critical thinking”. The results have been shown in Table 1.

Table 1 Numbers and Percentages of “senior secondary school students” in different Levels of “critical thinking”

Levels of Critical	Number of Senior secondary	Percentage of Senior
Low	59	17.82
Average	216	65.26
High	56	16.92
Overall	331	100.00

Table 1 shows that the out of the 331 “senior secondary school students” that constituted the sample population, 216 “senior secondary school students” exhibit average “critical thinking”. The number of “senior secondary school students” with low level of Critical thinking is 59 and those with high Critical thinking scores are 56 “senior secondary school students”. The maximum number of “senior secondary school students” exhibit average level of “critical thinking”, while high “critical thinking” is shown by the minimum number of “senior secondary school students” from the selected sample. The percentage of “senior secondary school students” falling in the average “critical thinking” level is 65.26 %, while that in low and high “critical thinking” levels are 17.82 % and 16.92 % respectively.

“Learning styles” among “senior secondary school students”

The objective was to assess the “learning styles” of “senior secondary school students”. After administering the “learning styles” Scale, the “learning styles” of the sample population was examined with the help of the manual of Index of “learning styles”. The ILS scoring sheet (Thomas A. Titzinger, 2007) consists of four scales, each with 11 items: “Active (ACT)-Reflective (REF), Sensing (SEN) - Intuitive (INT), Visual (VIS)-Verbal (VRB), and Sequential (SEQ)-Global (GLO)”.

Percentage was calculated corresponding to the obtained number of “senior secondary school students” in each type of “learning styles”. The results have been shown in Table 2.

Table 2 Numbers and Percentages of “Senior secondary school students” in different “Learning styles”

Levels of “learning styles”	Number of “senior secondary school	Percentage of “senior secondary school
Active (ACT)	162	48.94
Reflective (REF)	169	51.06
Sensing (SEN)	131	39.58
Intuitive (INT)	200	60.42
Visual (VIS)	224	67.67
Verbal (VRB)	107	32.33
Sequential (SEQ)	190	57.40
Global (GLO)	141	42.60

Table 2 shows that the out of the 331 “senior secondary school students” that constituted the sample population, 162, 169, 131, 200, 224, 107, 190 and 141 “senior secondary school students” exhibit ACT, REF, SEN, INT, VIS, VRB, SEQ and GLO “learning styles” respectively. The percentage of “senior secondary school students” falling in ACT, REF, SEN, INT, VIS, VRB, SEQ and GLO “learning styles” 48.94, 51.06, 39.58, 60.42 ,67.67, 32.33, 57.40 and 42.60 respectively. The majority of “senior secondary school students” possess REF, INT, VIS and SEQ “learning styles”.

Difference in “critical thinking” of “senior secondary school students” With respect To “learning styles”

The objective was to find out the difference in the “critical thinking” of “senior secondary school students” with respect to “learning styles”. After administrating the “critical thinking” Scale, Mean, Standard Deviation, Standard Error of Difference and z’-value of the “critical thinking” of “senior secondary school students” were computed and the results are presented in Table 3

H₀: There exists no significant difference in the “critical thinking” of “senior secondary school students” with respect to “learning styles”.

Table 3 Significance of Difference between Means of “critical thinking” of “senior secondary school students” with respect to “learning styles”

“learning styles”	N	Mean	SD	SE _D	z'-value	df	Remarks
ACT	162	69.91	11.62	1.22	0.74	329	P > 0.05
REF	169	68.70	10.47				
SEN	131	68.89	11.73	1.27	0.34	329	P > 0.05
INT	200	69.32	10.60				
VIS	224	68.64	10.89	1.32	1.19	329	P > 0.05
VRB	107	70.21	11.35				
SEQ	190	68.53	10.70	1.24	1.17	329	P > 0.05
GLO	141	69.98	11.48				

Table 3 shows the Mean scores, Standard Deviation, Standard Error of Difference and z'-value of “critical thinking” of “senior secondary school students” with respect to different “learning styles”. The table reveals that the Mean “critical thinking” scores of “senior secondary school students” having “learning styles” namely “ACT and REF; SEN and INT; VIS and VAR; and SEQ and GLO” are 69.91 and 68.70; 68.89 and 69.32; 68.64 and 70.21; and 68.53 and 69.98 respectively. It may be concluded that the “senior secondary school students” having “learning styles” namely ACT, INT, VAR and GLO have better “critical thinking” than secondary school students having “learning styles” namely “REF, SEN, VIS and SEQ”. The value of Standard Deviation in case of “senior secondary school students” having “learning styles” namely “ACT and REF; SEN and INT; VIS and VRB; and SEQ and GLO” are 11.62 and 10.47; 11.73 and 10.60; 10.89 and 11.35; and 10.70 and 11.48 respectively. The z'-value of “senior secondary school students” having “learning styles” namely ACT and REF; SEN and INT; VIS and VAR; and SEQ and GLO in terms of “critical thinking” comes out to be 0.74, 0.34, 1.19 and 1.17 respectively which are statistically not significant at 0.05 level of confidence. It shows that “senior secondary school students” having “learning styles” namely

“ACT and REF; SEN and INT; VIS and VAR; and SEQ and GLO” statistically not differ from each other in “critical thinking”.

Hence, for the stated hypothesis there is no significant difference in the “critical thinking” of “senior secondary school students” with respect to “learning styles” and the null hypothesis is not rejected at 0.05 level of confidence.

Results and Discussion

Most of the “senior secondary school students” exhibited average level of “critical thinking”, while high level of “critical thinking” is shown by the least number of “senior secondary school students” from the selected sample. The percentage of “senior secondary school students” falling in the average “critical thinking” level is 65.26 %, while that in low and high “critical thinking” levels are 17.82 % and 16.92 % respectively. Hence it can be inferred that most of the students are of senior secondary school are having average “critical thinking” level.

The majority of “senior secondary school students” possess Reflective (REF), Intuitive (INT), Visual (VIS) and Sequential (SEQ) “learning styles”. Results have also shown that there exists no significant difference in the “critical thinking” of “senior secondary school students” with respect to “learning styles”. Hence it can be concluded that there is no effect of leaning style on “critical thinking” of the senior secondary students.

The results of the study can help the instructors and teachers to understand the students learning environment in a better manner and help them in effective designing of instructional/guidance material.

References

- Bolstad, R., and Hipkins, R., (2005), Time for critical thinking in secondary science, *Paper presented at the conference of the Australasian Science Education Research Association (ASERA), University of Waikato, Retrieved from <http://www.nzcer.org.nz/pdfs/14395.pdf>*
- Chan, D., (2001), Learning Styles of Gifted and Nongifted Secondary Students in Hong Kong. *Gifted Child Quarterly - GIFTED CHILD QUAR.*, Vol. 45, pp 35-44, doi 10.1177/001698620104500106.
- Domino, G., (1970),. Interactive effects of achievement orientation and teaching style on academic achievement, *ACT Research Report*, Vol.39, pp 1-8.

- Hassan, K. E. & Madhum, G. (2007), Validating the Watson Glaser Critical Thinking Appraisal, *Higher Education*, Vol. 54, No. 3, pp. 361-383 Retrieved from <http://philosophy.hku.hk/think/critical/ct.php>
- King, P. M., Wood, P. K., and Robert A. Mines, R. A., (1990), Critical Thinking Among College and Graduate Students, *The Review of Higher Education*, Vol. 13, No. 2, pp. 167-186
- Kolb, D. A. (1984), *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice Hall
- Mathews, D., 1996. An investigation of learning styles and perceived academic achievement for high school students. *Clearing House*, Vol 69, pp 249-254, accessed from http://eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=EJ530454&ERICExtSearch_SearchType_0=no&accno=EJ530454
- Mincemoyer, C., Perkins, D. F., & Munyua, C. (2001). Critical Thinking in Everyday Life. Retrieved on July 11, 2016 from: [http://cyfernetsearch.org/sites/default/files/PsychometricsFiles/Critical%20Thinking%20in%20Everyday%20Life\(12-18%20yrs\)_0.pdf](http://cyfernetsearch.org/sites/default/files/PsychometricsFiles/Critical%20Thinking%20in%20Everyday%20Life(12-18%20yrs)_0.pdf)
- Pashler, H. McDaniel, Rohrer, M.D. & Bjork, R. (2008), Learning Styles: Concepts and Evidence, *Psychological Science in the Public Interest*, Vol. 9, No. 3, pp. 105-119
- Rabak T. (1988), Beyond Theory: The Art and Practice of Critical Thinking, *Journal of Correctional Education*, Vol. 39, No. 2, pp. 54-57
- Sabri, P.S.U., Ilyas, M., and Amjad, Z. (2015), Organizational Learning Culture and its Effects on Critical thinking skills on Female Teachers of Public Sector HEI, *Bulletin of Education and Research*, Vol. 37, No. 2
- Shrivastava. A., (2002). A Study of Learning Styles of Secondary School Students with Scientific Attitude and their Achievement in Science. *Unpublished. Ph.D., Education*. University of Lucknow.
- Smith. P., Dalton. J., (2005), *Getting to grips with learning styles*, NCVER, ISBN 1920896872
- Thomas A. Litzinger , Sang Ha Lee, John C. Wise, & Richard M. Felder, (2007), A Psychometric Study of the Index of Learning Styles, *Journal of Engineering education*, Vol. 96, Issue 4, pp 309-319, <https://doi.org/10.1002/j.2168-9830.2007.tb00941.x>
- Verma, P., (2006), Variability in learning styles of university students in different courses. *Indian J. Psychometry Educ.*, Vol 37, pp 156-160.
- Wehrwein, EA. Lujan. HL. & DiCarlo, SE., (2007), Gender differences in learning style preferences among undergraduate physiology students, *Adv Physiol Educ*, Vol 3, pp 153–157, <https://doi.org/10.1152/advan.00060.2006>
- Willingham, D. T., (2007), Critical Thinking: Why Is It So Hard to Teach, *American educator*, pp 8-19
- Yildirim, B. and Özkahraman, S (2007), Critical thinking in nursing and learning styles, *International Journal of Humanities and Social Science*, Vol. 1 No. 18, pp 127- 133