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RESEARCH ARTICLE

DEVELOPMENT OF A TEST FOR ASSESSMENT OF CRITICAL THINKING SKILLS

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Abstract

The aim of this study was to develop a critical thinking test for B.Ed. trainees. The developmentalresearchmethod was used for the construction of the test. A sample of 238 and 276 trainees were selected purposively from the various B.Ed. colleges affiliated to DAVV, Indorefor the preliminary tryout and establishing the reliability of the test respectively. Most of the Critical Thinking Tests are constructed in the foreign countries and some of tests are constructed in Indian context, but the test which are constructed in Indian context, emphasis is given on aspects related to Process of Thinking, Product of Thinking, in one tool whereas in another tools Interpretation, Analysis, Evaluation, Inference, Explanation and Self – regulation related items were included. In these tools dimensions like facts, opinion, induction-deduction reasoning are not included, so investigators decided to construct a Critical Thinking Skill Test for assessing the B.Ed. trainees Critical Thinking Skill. Content validity /face validity was used for the validation of the assessment and test-retest method was used for establishing the reliability of the test. The result showed the test was validly developed with the reliability coefficient 0.91.

Introduction

In everyday life, decision-making is a crucial skill that requires various abilities like: reasoning, Comprehension, interpretation, analysis, and synthesis. People's ability to make decisions can vary, often depending on their critical thinking skills. This is especially true for teachers, as they regularly make decisions that shape their students' learning experiences and development. Teachers, in particular, need to strengthen their critical thinking skills by questioning assumptions, evaluating information, and considering different perspectives, they can make better instructional decisions. They often face challenges in the classroom, requiring them to analyze problems, identify solutions, and implement strategies effectively. This kind of problem-solving helps in making sound decisions in both academic and non-academic situations. For teachers, it is crucial to reflect on the impact of their decisions, whether related to lesson planning or classroom management. This reflection helps them assess what worked, identify areas for improvement, and adapt their approach for teaching learning process. For improving the Decision Making ability, firstly, it is essential to assess the Critical thinking, so that it is required a test of Critical Thinking Skills.

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Critical Thinking

Critical thinking is the process of analysing and evaluating thinking with the idea of improving it and taking it to a higher level. It is a mode of thinking about any subject, content, or problem in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them (Cascini& Rich, 2007).

A study conducted by Raths, Jonas, Rothstein and Wassermann in 1967 (as cited in Carr, 1990) and the study conducted by Ennis (1990) suggested that the development of thinking skills is best done in association with specific content or within domain of knowledge. Bransford, Vye, Kinzer and Risko (1990) suggested that one way to help students develop critical thinking skills is to focus on problems or cases where they are challenged to deal with real data and experiences. Bowers (2006, as cited in Krishnan, D. 2011) stated that "Teaching of critical thinking should be integrated into all courses and in all classroom areas lectures, discussions, home-work and writing assignments." Teachers would benefit the most by having access to discipline specific learning activities that they can seamlessly integrate into their courses.

Paul (1995) defines critical thinking as a thinking that displays mastery of intellectual skills and abilities, and disciplined, self-direction thinking that exemplifies the perfections of thinking appropriate to a specific mode or domain of thinking. In Watson Glaser Critical Thinking Appraisal [WGCTA), critical thinking is defined as a composite of attitudes, knowledge, and skills. As per WGCTA, critical thinking is an attitude of inquiry that involves an ability to recognize the existence of problems, knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidences are logically determined and skills in employing and applying the above attitudes and knowledge. (Huitt, 1998,, as cited in Krishnan, D. 2011) Critical thinking is the disciplined mental activity of evaluating arguments or propositions and making judgments that can guide the development of beliefs and taking action.

Burden and Byrd (1994, as cited in Krishnan, D. 2011) categorize critical thinking as a higher-order thinking activity which requires a set of cognitive skills. Having had different definitions and meanings for critical thinking, a group of leading researchers with expertise in the field were asked to define critical thinking through a Delphi study to achieve some clarity in the definition of critical thinking (Facione, 1990). The experts emphasized that critical thinking as purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. They hypothesized that there are a set of intellectual virtues or habits of mind that reflect one's dispositions to think critically.

From the above-mentioned definitions, it can be said that in the Critical Thinking Skills various aspects i.e. analysis, interpretation, deduction, reasoning, inference, facts and opinion are to be included.

Objective

To develop the Critical Thinking Skills test

Sample

The Critical Thinking skills test was developed for the assessment of Critical Thinking skills of B.Ed. Trainees. For the standardization process of tool, the sample was selected in two levels i.e. (i) Preliminary try out (for Item Analysis) and (ii) Establishment of Reliability and Norms.

Preliminary Try out

For Preliminary Try out stage, the sample was selected from seven Teacher Training Colleges which were affiliated to DAVV, Indore city. The sample comprised of 238 B.Ed. Trainees of third Semester.

Establishment of Reliability and Norms

At this level**,** the sample comprised of 276 B.Ed. Trainees of first semester from seven colleges of Teacher Training of Indore City. All colleges were affiliated to DAVV.

Assessment Tool

In this study, a test for assessing students' critical thinking for B.Ed. trainees 21-35 years of age was developed to assess the students' critical thinking. Most of the Available Critical Thinking Skills Tests are developed in foreign countries which are not suitable in Indian contexts. The test was assessed on a sample of 232 and 276 trainees of the B.Ed. of Science stream.

Methodology

Planning

In research, Identification of the problem is crucial step. A necessary analysis was performed. The researcher has reviewed several books and previous relevant researches. The researcher went through the literature on Critical Thinking Skills tests, and discussion with the subject experts of education colleges to seek their view to plan appropriate critical thinking test for B.Ed. trainees with 21-30 years of age. The test items were prepared on cognitive skills i.e. analogy, fact, opinion, argument, inference, deduction reasoning, assumption and comparison skill.

Operational Definition of Critical Thinking

It is referred to various cognitive skills i.e. analogy, fact, opinion, argument, inference, deduction reasoning, assumption and comparison skill. It is assessed through the composite scores on various skills of the Critical Thinking Skills Test.

Dimension-wise Preparation of Preliminary Draft of the Test

On the basis of operational definition, a total of eight dimensions were identified for constructing the Critical Thinking Skill Test. Investigators has developed 69 questions related to eight dimensions of Critical Thinking Skill Test. The details of the dimension wise distribution of questions in the preliminary draft of the test are presented below in table 1.0.

Table 1.0:- Dimension-wise distribution of Items for the Preliminary draft of Critical ThinkingSkill Test.

S. No.	Dimensions	Sections	Total No. Questions
1.	Analogy	A	8
2& 3	Fact and opinion	B&C	10
4.	Argument	D	9
5.	Inference	E	18
6	Deductive Reasoning	F	10
7	Assumption	G	7
8	Comparison	H	7
	Total of Questions		**69**

Expert Opinion

This preliminary draft of the tool along with concise information of the areas of critical thinking skills has been given to four experts in the field of education for their suggestions. The questions were judged by the experts based on appropriateness, relevance, and usability of tool in Indian setting for B. Ed. Trainees. On the basis of their remarks 10 questions were modified and four questions were removed. A modified draft of 65 questions was used for preliminary tryout.

Preliminary Small Group Tryout

The test of 65 Questions was given to a small sample of 20 B.Ed. Trainees. They were asked to check to the clarity of instructions, time given for the completion of the test, understandability of questions, difficulty in vocabulary, clarity of questions, ambiguity in the questions and complexity of questions. The students queries related to the language of question, vocabulary and understanding were taken into consideration and some ambiguous and complex sentences were modified.

Tryout for Item Analysis

At this stage the sample was selected from seven Teacher Training Colleges of Indore City.Instructions for students were given on the cover page. One mark was decided for each correct answer. Further, the test was assessed on a sample of 232 B.Ed. trainees of Indore city. B.Ed. Trainees have been tested and their obtained scores were

arranged in descending order, from this upper 27 Percent and lower 27 Percent were identified, both the groups have consisted 128 students whose scores were taken further for item analysis of Critical Thinking Skills Test. The discrimination power of each question was obtained by using independent t-test and the difficulty indices were checked through the formula of difficulty indices i.e. RU+RL/2N. Out of 65 questions 23 questions were removed as their either item discrimination indices is not significantly differed or their item difficulty value is either less than 20 or greater than 80. In this way in the final test 42 questions were retained. Out of them six questions were of Analogy, six were of Facts and Opinion, five were of Argument , eight were of Inference, 4 were of Deductive Reasoning, 7 were of Assumption, and 6 were of Comparison.

Reliability of Critical Thinking Skills Test

The final form of the critical thinking skills test was administered to 276 B.Ed. trainees of Teacher Training Colleges of Indore city. The test was scored and tabulated to find out the reliability. Thetest-retest method was used for establishing the reliability of the test. The test-retest was found to be 0.91 (N=276, p<.01). Hence the test was considered as reliable.

Validity of Critical Thinking Skills Test

Content validity was done by four subject experts.For internal validity, dimension wise correlation was assessed. The coefficient of correlation between dimensions and total test scores ranges between 0.79 and 0.93, which shows that each dimension is an integral part of the total test. This establishes the validity of the test.

Objectivity and Practicability

Scoring and administration of the test should be objective in nature. At the time of construction of the test, somepoints were kept in mind that personal opinion, interests and attitudes of theexaminee and the examiner could not affect test scores. For the clear and precise scoring rules for each item, investigator has constructed that type of questionswhich have definite answers. Investigators have decided that for each right answer one mark will be given to responder and zero scores will be given for each wrong answer. The practicability of the test lies in the administration of a test. The present Critical Thinking Skills test is easy toadminister and inexpensive. The time duration for conducting the test is 45 minutes. The test can be administered individually or in small groups.

Result

For preparing students of 21st century; analogy, fact, opinion, argument, inference, deduction reasoning, assumption and comparison skills are required, so that the test for assessing Critical Thinking Skillshas been developed.

References

1. Akyüza, H. I. &Samsa, S. (2009). The effects of blended learning environment on the critical thinking.Procedia Social and Behavioral Sciences 1, 1744–1748.
2. Alotaibi, K. N. (2013). The effect of blended learning on developing critical thinking skills.Education Journal, 2(4), 176-185.
3. Bowers, N. (2006). Instructional support for the teaching of critical thinking: Looking beyond the red brick walls. In Kirshnan, D. (2011).Effect of blended learning strategy on higher order thinking and learning science among secondary school students. [Ph.D. Thesis, University of Mysore] http://hdl.handle.net/10603/73173
4. Bransford, J.D., Vye, N., Kinzer, C., &Risko, V. (1990). Teaching thinking and content knowledge: Toward an integrated approach. In Kirshnan, D. (2011).Effect of blended learning strategy on higher order thinking and learning science among secondary school students. [Ph.D. Thesis, University of Mysore] http://hdl.handle.net/10603/73173
5. Burden, P.R., & Byrd, D.M. (1994).Methods of effective teaching. Boston, M: Allyn and Bacon, Inc. In Kirshnan, D. (2011).Effect of blended learning strategy on higher order thinking and learning science among secondary school students. [Ph.D. Thesis, University of Mysore] http://hdl.handle.net/10603/73173
6. Carr, K.S. (1990). How can we teach critical thinking. ERIC Digest Retrieved from ERIC database. (ED326304). In Kirshnan, D. (2011).Effect of blended learning strategy on higher order thinking and learning science among secondary school students. [Ph.D. Thesis, University of Mysore] http://hdl.handle.net/10603/73173
7. Cascini, T.K., & Rich, J.A. (2007). Developing critical thinking skills in the intermediate accounting class: using simulations with rubrics. Journal of Business Case Studies, 3(2).http://www.cluteinstituteonlinejournals.com/archives/abstract. cfm?ArticleID=26

8. Ennis, R.H. (1990). The extent to which critical thinking is subject specific: further clarification. In Kirshnan, D. (2011).Effect of blended learning strategy on higher order thinking and learning science among secondary school students. [Ph.D. Thesis, University of Mysore] http://hdl.handle.net/10603/73173
9. Facione, P.A. (1990). Critical thinking: A Statement of Expert Consensus for Purposes of Educational Assessment. The Delphi Report, Insight Assessment. Milbrae, CA: California Academic Press.
10. Ferdinand, P. (2004). Fostering self-directed learning in the science domain with eLearning and hands-on experiments.In Kirshnan, D. (2011).Effect of blended learning strategy on higher order thinking and learning science among secondary school students.[Ph.D. Thesis, University of Mysore] http://hdl.handle.net/10603/73173
11. Fitria, Y. J., Floriasti, T. W., Djohan, &Sittiprapaporn, P. (2020). Mind mapping tool increased critical thinking through blended learning. Asian Journal of Medical Sciences, 11(1), 42–50. https://doi-org.sdl.idm.oclc.org/10.3126/ajms.v11i1.26516
12. Harish, G.C. (2011). Impact of integrated critical thinking skills on achievement in mathematics of secondary school students.Edutracks, 10(8), 28-30.
13. Hasanah, H. & Malik, M. N. (2020). Blended learning in improving students' critical thinking and communication skills at University. Cypriot Journal of Educational Science.15(5), 1295 - 1306.https://doi.org/10.18844/cjes.v15i5.5168
14. Huitt, W. (1998). Critical thinking: An overview. Educational Psychology Interactive. Valdosta, GA: Valdosta State University. Retrieved from http://www.edpsyc interactive. org/topics/cogsys/critthnk.html.
15. Korkmaz O, Karakus U.The Impact of Blended Learning Model on Student Attitudes towards Geography Course and Their Critical Thinking Dispositions and Levels.Turkish Online Journal of Educational Technology - TOJET.2009;8(4), 51-63. Accessed January 25, 2021.http://search.ebscohost.com.sdl.idm.oclc.org/login.aspx?direct=true&db=eric&AN=EJ859497&site=eds-live
16. MarhenyLukitasari, Indah Purnamasari, Sri Utami, &AkhmadSukri. (2019). Blended-Problem-Based Learning: How its impact on students' critical thinking skills? JournalPendidikanBiologi Indonesia, 5(3), 425–434. https://doi-org.sdl.idm.oclc.org/10.22219/jpbi.v5i3.10048l
17. Paul, R. (1995). Critical thinking: how to prepare students for a rapidly changing world. In Kirshnan, D. (2011).Effect of blended learning strategy on higher order thinking and learning science among secondary school students. [Ph.D. Thesis, University of Mysore] http://hdl.handle.net/10603/73173.