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Research Paper

Rhizomatic-based educational model and its effect on creative thinking

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Abstract

Aim: Educational systems require optimal educational methods to achieve their large-scale goals and promote creative thinking. This study aimed to propose a rhizomatic model for training creative thinking. This mixed-methods exploratory research proposed and approved a model. The rhizomatic model was designed and presented qualitatively, and then implemented via a quantitative quasi-experimental design. In the quantitative phase, the statistical population comprised all the sixth-grade male students in state-run schools of Sahneh (Iran) in the academic year 2018-2019. A sample was selected purposively from two classes in this city. A class of 34 students served as the experimental group, and another class of 34 as the control group. The data collection tool was Schaeffer's Creative Attitude Survey. The analysis of covariance demonstrated the model's influence on the students' creative thinking growth

***Keywords**: Education; rhizomatic; creative thinking*

Introduction

Research indicates that teachers, from kindergarten to high school, have diminished students' creativity over the past two decades because creativity is associated with nonconformity, impulsivity, and disruption of class activities (Shahalizadeh et al., 2014). Educational authorities must, therefore, focus on the improvement of creativity in teachers and students (Magdalena and Krzysztof, 2013, pp. 18-19).

Post-structuralist philosophers Deleuze and Guattari believe that thinking used to be tree-like, vertical, and hierarchical in the past; in the contemporary world, however, it is rhizomatic and horizontal (Raeesi, Mahmoudi, and Oveisi Kahkha, 2019). In rhizomatic thinking, the educational setting is open to new ideas. Learners grow through discussion, curiosity, and participation in learning, and teachers act as guides or facilitators in students' process of discovery (Charney, 2017). Zamani (2020), Shakoori Monfared and Ardalani (2020), Sajjadi and Baghernejad (2011), Selahshoori and Haghverdi (2015), Ahmadabadi, Farajollahi, and Abollahyar (2017) studied rhizomatic education and its relationship with creativity, the curricula, education, philosophy, and epistemology.

According to what was stated, a close tie between rhizomatic thinking and creativity has been established. The present study aimed to identify and document the dimensions and components of the educational model of rhizomatic thinking, and then assess the model's impact on the creativity of sixth-grade students in the Experimental Sciences course. This study addressed the following questions:

1. What are the dimensions and components of rhizomatic education?
2. Does the rhizomatic educational model promote students' creative thinking?

Methodology

This was a mixed-methods research. Herein, based on the research objectives and questions, the two-phase exploratory sequential design of the theory-building type was deemed to be the best design. In the qualitative phase, the relevant literature was analyzed with a review of the theoretical foundations using deductive content analysis, and the rhizomatic education model was extracted. Due to the plurality of sources, a sample of accessible print and digital documents was purposively selected. The data were collected via note-taking. After extracting the initial concepts, semi-structured interviews were conducted with six experts to develop the rhizomatic thinking educational model. Confirmability and credibility were adopted to validate the results through triangulation. Inter-rater agreement

served as a reliability measure. Then, the data were analyzed by thematic analysis. In the quantitative phase, a quasi-experimental pretest-posttest design was employed. The statistical population comprised all the sixth-grade male students in state-run schools of Sahneh (Iran) in the academic year 2018-2019. Two classes were purposively selected as the sample. A class of 34 students taking the Experimental Sciences course served as the experimental group, and another class of 34 as the control group. The experimental group was educated based on the educational model (rhizomatic content and method) in three sessions, while the control group received conventional education (conventional content and method). The data collection tool was Schaeffer's Creative Attitude Survey. To assess the reliability of the test, a Cronbach's alpha of 0.82 was calculated based on the scores of 26 students. The data were analyzed via multivariate analysis of covariance (MANCOVA).

Results

The first question was qualitatively answered. Among the limited resources and documents available on rhizomatic thinking (two specialized books, two theses/dissertations, and 11 research articles on rhizomatic education), 129 statements were extracted upon an in-depth review; then, 17 basic themes and six organizing themes were extracted: methodological thinking, design thinking, deconstructive thinking, creative thinking, conflicts, and the concept of communication. In the quantitative phase, a univariate analysis of covariance (ANCOVA) was run in SPSS 22 to assess the research hypotheses. The mean ± SD of the pretest scores of creativity were 12.44 ± 3.72 and 11.64 ± 3.32 in the experimental and control groups, respectively. The mean ± SD of the posttest scores of creativity were 17.79 ± 4.47 and 12.05 ± 3.65 in the experimental and control groups, respectively.

Table 1. Descriptive statistics of creativity in the two groups

Type of test	Source of variation	Sum of squares	Df	Mean of squares	F value	Significance level
Pretest	Between-groups	13.48	1	13.48	2.005	0.05
	Within-group	1223.64	66	6.77		
	Total	1237.12	67			
Posttest	Between-groups	172.19	1	172.19	35.53	0.0001
	Within-group	1298.71	66	7.141		
	Total	1470.9	67			

The F value was not significant at the 0.05 level on pretest in the two groups (F = 2.005, df = 1), yet it was significant at the 0.0001 level on posttest in the two groups (F = 35.53, df = 1, p > 0.0001) (Table 1). Therefore, the rhizomatic educational model affects students' creativity. For a closer examination of mean and SD, the gains made by each group are presented in Table 2.

Table 2. A comparison of experimental and control groups in terms of gains

Groups	Number	Mean	SD	t	Df	Significance level
Experimental	34	4.80	3.53	2.66	66	0.008
Control	34	3.20	3.55			

Table 2 demonstrates the higher mean gains made by the experimental compared to the control group, and this difference was significant (t = 2.66, df = 66, p > 0.0008). Although the means of both groups increased on the posttest, the magnitude of this increase was greater in the experimental than that in the control group.

Discussion and conclusion

In this study, we designed and presented a rhizomatic-based educational model and assessed its effects on the creative thinking of the sixth-grade male students. In the first phase, the rhizomatic educational model was qualitatively designed and presented. In the second phase, the magnitude of the effect of this model on students' creative thinking growth was assessed via a quasi-experimental quantitative design. The findings revealed that creativity was enhanced in the group educated based on the rhizomatic model. This finding is consistent with the results reported by Cronje (2018), Wilson (2018), Zamani (2020), Shakoori Monfared and Ardalani (2020), Abdollahyar, Sobhaninejad, and Farmihani (2019), Ahmadabadi Arani, Farajollahi, and Abdollahyar (2017), Selahshoori and Haghverdi (2015).

Implications of this study include: 1. More educational courses can be offered to teachers and students to familiarize them with rhizomatic thinking-based education so that they can accurately implement it. 2. The school and class setting can be adapted to the dimensions, components, and skills of rhizomatic education.

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