


Chapter 11

Neutrosophic Cognitive Impact Study on Role Transformation of Teachers to Facilitators

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ABSTRACT

The field of education is witnessing paradigm changes, especially with reference to characterization of teachers and their roles. The inception of digital learning portals has widened the information sources of the learners and masked the belief of teachers as the only pool of knowledge. The mutating pedagogies have defined teacher as a facilitator in a learning environment. This chapter investigates on the impacts caused by the transformation of a teacher's role to a facilitator in the intra- and inter- personal dimensions of teachers and also on the classroom environment. This research work also investigates the consequences of teachers adapting to new roles and the immediate impacts on the learners of various kinds. A mathematical model is formulated using neutrosophic cognitive maps to profoundly explore the impacts of role transformation. The consequential impacts analysed using neutrosophic representations are more promising in comparison with other kinds of demonstrations.

INTRODUCTION

A comprehensive decision-making process with a complete picture of persuading factors subjected to the expert's opinion blended with available information system and knowledge spectrum is the requisite of decision makers in making optimal decisions. The approaches of making decisions are modelled us-

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ing different tools and techniques and cognitive maps developed by Robert Axelrod is one of the tools especially used extensively in making decisions in the areas of medical diagnosis. Cognitive maps are graphical representations with factors as nodes of the graph and the relationship between the factors represent as the edges of the graph. Cognitive maps have simple edge weights as either -1,0,1. The value 1 represents the positive influence of one factor over another. The negative influence between the factors is represented by -1 and the value 0 represent null influence between the factors. As uncertainty obstructs decision –making, Kosko (1986) extended cognitive maps to fuzzy cognitive maps. In FCM, the representations are characterized using fuzzy sets and the edge weights are weighted in nature and it assumes the values from -1 to 1. The FCMs are advantageous as it do not confine the associational impacts between the factors to discrete values, rather it has continuous edge weight values. Intuitionistic FCMs are extended versions of FCM in which the fuzzy set representations are substituted by intuitionistic representations. Atanssov (1986) introduced intuitionistic sets and to overcome uncertainty in making decisions. In IFCM, the edge weights are denoted by both membership and non-membership values. The membership value indicates the degree of associational impact between the factors and the non-membership values represent the non-associational impacts between the factors.

In addition to uncertainty, many a times the process of making optimal decisions is intervened by indeterminacies. To handle such problems of both uncertainty and indeterminacies, Smarandache (2005) introduced a most generalized form of set labelled as Neutrosophic sets which are characterized by a triplet consisting of truth, indeterminate and falsity values. Vasantha and Smarandache (2004) developed NCM for the first time and constructed many social oriented models dealing the emotional, psycho social impacts of labour migration. In NCM model the edge weights assume values as either 1,-1,0 or I, where I represents the indeterminacy. NCMs are highly robust in nature in comparison with IFCM and FCM. NCMs are widely applied in several fields especially in the areas of agriculture, social, medicine, business, management, decision-making, education, psychology, environment and in many other domains. Researchers have extended NCM models integrating with other decision-making approaches especially with PESTEL, genetic algorithm, neutrosophic logic, static analysis and few other of the same kind to develop hybrid NCM models of decision-making.

A complete description of NCM applications in various fields specifying the nature of the problem and the nature of the NCM model is presented in Table 1.1 as follows.

Table 1. Applications of NCM

Authors	Field of Application	Problem addressed	Nature of NCM model
Choez, W. O., Cortázar, M. Q., Cruz, S. H., & Carvache, K. R. (2015).	Agriculture	Farming initiatives	PEST analysis
Avilés, R. A. G., Villalba, M. F. G., Segura, C. M. L., & Placeres, I. B. (2020).		Production yield	Conventional NCM
Senthilkumar, T. P., & Prabhusundhar, P.(2022)		Rice disease prediction.	Machine learning & NCM
Shadrach, F. D., & Kandasamy, G. (2021).		Leaf disease diagnosis	Neutrosophic cognitive maps (NCM) based feature selection approach

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