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Factorial Validity and Internal Reliability Estimation of Counsellors' Aptitude scale

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The present study aims at the development of a psychological self-reported device to gauge Aptitude for Counselling Psychology. Exploratory factor analytical study was designed to construct and unearth the factorial structure of self-reported Aptitude test to screen effective counsellor. Reviewed literature pertinent to counsellors' characteristics disclosed myriads of prerequisite characteristics. Initial draft of 365 items submitted for experts' reviews was subsequently reduced to 312 items. After administering items on a sample of 205 participants, quantitative item-analysis for said items results in 166 items having satisfactory corrected item-total correlation and dimension-wise alpha above .70. After having a statistical check on assumptions, Principal component analysis (PCA) condensed 166 items onto 25 1st order factors explaining 59.42% of variance, although correlated. The 2nd and 3rd order factor solution produce somewhat factorially pure structure, where 2 higher order factors extracted for 6 2nd order factors explicated 43.82% of variance after rotating factors orthogonally. The loading on Higher order factors ranged between .692 to .712. The internal consistency coefficient indexed as Cronbach's alpha was reported .95. Initially recommended and selected dimensions converged on 2 factors with statistically substantial loadings. The correlated nature of 166 items within 14 dimensions generated 25, 6, and 2 factors for 1st, 2nd, and 3rd order PCA, respectively.

Keywords: Aptitude, Item Analysis, Exploratory Factor Analysis, Cronbach's Alpha.

Aptitude as defined in Warren's Dictionary (1933) "a condition or set of characteristics regarded as symptomatic of an individual's ability to acquire with training some (usually specified) knowledge, skill, or set of responses such as the ability to speak a language, to produce music, etc." A counselling aptitude test, for example, would assess if someone possesses the qualities needed to effectively address client problems. Unlike tests that measure current skills, aptitude tests look ahead, and assess a person's current abilities and characteristics (like a snapshot of their potential today) to predict their future success in a specific field. Past achievements in related areas, general cognitive abilities (intelligence), personality traits, specific

interests, and relevant skills (like communication in counselling) all contribute to aptitude in a field. So, Aptitude is not a single, fixed trait, rather "set of characteristics" which implies that aptitude is more like a constellation - a combination of various abilities and characteristics working together. By looking at this constellation, aptitude tests give us an estimate of a person's potential for future accomplishment in a field.

Aptitude for Counselling Psychology

Identifying effective counsellors can be a challenge. The profession itself is often steeped in emotions, and there is no single, clear-cut definition of success or failure



IoT based healthcare system selection with picture fuzzy modified combined compromise solution based on distance measure and score function

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Abstract

The importance of Internet of Things (IoT) based Healthcare systems for remote patients in modern days is very significant and multifaceted, addressing various challenges and bringing numerous benefits. These systems hold significant promises for improving the quality, accessibility, and cost-effectiveness of care for remote patients. Selection of a suitable IoT based healthcare system is a crucial task which require the evaluation of each system relative to certain conflicting criteria such as patient comfort, accuracy, cost data security and connectivity. Picture Fuzzy (PF) sets, an extension of fuzzy sets, incorporate an additional degree of freedom by considering positive, neutral and negative membership degrees, thus providing a more nuanced representation of uncertainty. Combined Compromise Solution (CoCoSo) method is one of the prominent methods used to solve decision making problems. But this method has certain limitations as the integration function used in this method fail to assign appropriate ranking to the alternatives in some special situations. A modified CoCoSo framework in PF environment is described in this research to address the issue of identifying suitable IoT-based healthcare system based on several criteria. For this, a new PF distance measure is proposed and establish its superiority in finding the pattern similarity of unknown patterns through some numerical examples. A novel score function that overcomes the shortcomings of the existing score functions is provided in order to address the comparison issue of PF numbers. A new integration function is provided which overcome the aggregation biases of function used in traditional CoCoSo method.

Keywords Picture fuzzy set · Distance measure · Score function · CoCoSo · MCDM

Abbreviations

DM	Decision Making
MCDM	Multi Criteria Decision Making
PFD	Picture Fuzzy Distance Measure
PFS(X)	Set of all picture fuzzy sets of X

1 Introduction

Fuzzy set theory, introduced by Zadeh [53] has significantly impacted various fields by allowing the handling of uncertainty and imprecision in data. Traditional fuzzy set extend classical set theory by enabling partial membership, characterized by a membership function ranging between 0 and 1. However, as the complexity of real-world problems increased, so did the need for more expressive models of uncertainty. A more sophisticated approach for managing uncertainty in real-world situations is provided by Atanassov [3], who presented the idea of Intuitionistic Fuzzy (IF) sets as an extension of fuzzy sets by assigning each element an addition degree i.e., non-membership degree. Various authors have used the concept of IF sets in medical diagnosis [9, 54], decision management [49, 50], artificial intelligence [4, 28], statistical analysis [21] and in image processing, etc. But, in real world, some people favour a particular party or person or situation, some people oppose, but there are people who remain neutral or refused to share

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