EMPIRICALLY-DERIVED SUBTYPES OF MILD COGNITIVE IMPAIRMENT (MCI) AND VASCULAR RISK FACTORS

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Abstract

Recent efforts have classified subtypes of mild cognitive impairment (MCI) using neuropsychological performance into distinct groups based on cognitive profiles (e.g., amnestic and dysexecutive). This study aimed to statistically derive MCI subtypes using an innovative analytical approach, latent class analysis (LCA), which empirically assesses the structure of heterogeneous syndromes. MCI participants from the Vanderbilt Memory and Aging Project (n=119, 73±7 years, 41% female) completed a neuropsychological protocol, including California Verbal Learning Test-II, Biber Figure Learning Test, Boston Naming Test, Animal Naming, WAIS-IV Digit Symbol Coding, DKEFS Number Sequencing, DKEFS Letter-Number Sequencing, DKEFS Tower Test, and DKEFS Color-Word Interference Test. MCI participant raw test performances were converted to z-scores. Using these z-scores, LCA was performed for the MCI sample. Three empirically-based MCI subtypes were identified, aligning with three cognitive severity classes, including early (n=33), middle (n=57), and late stage MCI (n=29) as evidenced by performance differences in the expected direction (e.g., early>late) on all neuropsychological tests (all p-values<0.001). Vascular risk factors among the three groups did not differ. Our findings suggest that MCI severity subtypes can be empirically derived. Future studies are needed to assess biomarker and risk profile differences among early, middle, and late stage MCI subtypes as well as longitudinal outcomes, such as diagnostic conversion.

PUBLIC SERVICE MOTIVATION IN THE VOLUNTEER STATE: AN INQUIRY INTO THE NATURE AND CAUSES OF PUBLIC SERVICE MOTIVATION AMONG ATTORNEYS EMPLOYED BY THE STATE OF TENNESSEE

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Abstract

Public Service Motivation is a leading issue in public administration literature. This study uses a mixed-methods research design and survey data to evaluate the existence of Public Service Motivation among attorneys employed by the State of Tennessee. The survey was distributed to the entire population of Tennessee-employed attorneys via e-mail and received 264 responses from 631 participants for a response rate of 41.8%. Data was collected using a survey instrument comprised of Perry's (1996) Public Service Motivation scale, Lewis and Frank's (2002) employment

motivation scale, and six open-ended employment motivation questions developed by the researcher. The researcher analyzed the quantitative data using logistic regression and analyzed the qualitative data using content analysis. The quantitative analysis reveals that Perry's scale—attraction to policy making, commitment to the public interest, and compassion—is not a good fit for the data. Several of Lewis and Frank's predictor variables—provide a valuable public service, job security, high income, an interesting job, helping other people, and flexible working hours—are effective predictors. The qualitative analysis reveals that Perry's scale is not an effective predictor of outcomes in the survey sample, while other motivational factors provide insight, including job characteristics, organizational characteristics, and mission valence. These results demonstrate that, when public sector attorneys in Tennessee are asked to identify their motivation in their own terms, public service motivation is not a significant motivator among the group as a whole. This study contributes to the literature by extending the study of Public Service Motivation to public sector attorneys employed by the State of Tennessee, using a mixed-methods approach, and answering calls for larger sample sizes, primary data, and contextual realism. The results suggest that additional research is needed to determine why Perry's scale does not fit the data in this particular context.

DEVELOPING NOVEL PROBIOTICS AND EVALUATING THEIR MECHANISMS OF INTERACTION WITH HOST ENVIRONMENT TO ENHANCE POULTRY PERFORMANCE

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Abstract

There are well documented problems associated with the continuous use of antibiotics in the poultry industry. Over the past few decades, probiotics have emerged as viable alternatives to antibiotics however the mode of action of these probiotics is not clearly understood. The overall goal of this study was to evaluate the modes of action of probiotics and their interaction with host, the broiler chicken. Amplification of the hypervariable region of the 16s rRNA gene was used to distinguish gastrointestinal tract (GIT) microbes of chicken and Guinea fowl (GF). 16s DNA library was constructed and sequencing template prepared using IonOneTouch-2 system. Sequencing data were analyzed using Core QIIME pipeline with GreenGenes and Microseq ID databases for phylogenetic diversity. Gut microbial profiles of chicken and GF revealed taxonomic diversity consisting of almost 150 families and diverse probiotic bacteria suggesting that the constitution of probiotics should be species specific. Acid and bile tests revealed the optimum prevalence of S.coelicolor was at pH 4-6.5 and 0-3.5% of bile concentrations. L.reuteri and S.coelicolor were selected from established microbial profiles and encapsulated to supplement with dietary treatments to the birds. In a 8 week study, 240 day old chicks and 216 day old Guinea keets were randomly assigned to four dietary treatments. The selected L.reuteri and S.coelicolor were added to the feed by using wheat middlings as a carrier at concentration of 100ppm (100mg/kg). Three dietary treatments contained two probiotic bacteria in three different proportions as L.reuteri and S.coelicolor individually at 100ppm, and mixture of L.reuteri and S.coelicolor at 50ppm each and the fourth treatment which had no probiotic bacteria served as control diet. Chickens fed diets containing L.reuteri and S.coelicolor mixture showed improved body weight gain, feed consumption, and decreased feed conversion ratios. Guinea fowls fed with L.reuteri showed improved body weight gain and feed consumption. Those GF birds fed with S.coelicolor showed lower feed conversion ratios when compare with other dietary treatments. The modes of action of probiotics were explained by transcriptome and metabolomic studies. This research therefore suggests that, L.reuteri and S.coelicolor have the potential to make good probiotics in both chickens and Guinea fowl production if administered together or separately depending on the performance index being considered.

TOWARDS INFRASTRUCTURE BASED SOFTWARE DEFINED SECURITY

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Abstract

Any nation's well-being relies upon secure and resilient critical infrastructure. Present day critical infrastructures are now increasingly exposed to cyber risks, which stem from growing integration of information and communications technologies such as Ethernet. Most existing security solutions can no longer contain ongoing cyber threats because the networked infrastructure systems were built to operate in static network configurations. These types of systems may give an attacker enough time to study specific system vulnerability, probe the network, collect network information and then launch an attack.

Software-defined networking (SDN) is an approach to computer networking that allows control and forwarding elements in the network to be disassociated, allowing for a range of considerably more flexible and effective network management and threat mitigation solutions. In this dissertation, Software Defined Networks (SDN) is used to address security in two critical infrastructures; cloud infrastructures and smart grid infrastructures.

Virtual Machine (VM) migration is the key player in Moving Target Defense (MTD) security in cloud infrastructures. To enhance the use of VM migrations as a security mechanism, this research explores to know the cost of VM Migrations in cloud infrastructures. This work addresses the cost of VM Migrations with Software Defined Networking (SDN) principles in a data center testbed characterized by wide-area network dynamics and realistic traffic scenarios. The results show that knowing the cost of VM Migration on the network ensures a successful VM Migration and improves the performance of competing flows in the network.

Regarding to security in smart grid infrastructures, the dissertation quantitatively assesses security risks in smart grids in the perspectives of both the defender and the attacker. An existing security quantification model is improved to include criticality of every smart grid component. SDN principles together with the improved security quantification model are used to address DoS attacks (link flood attacks) in a smart grid environment. The results show that using SDN relieves the network of link flood threats, hence improving the performance of IEC 61850 applications, making them IEC 61850 time compliant.

ADMINISTRATORS' AND TEACHERS' PERCEPTIONS OF RTI2 PROCESSES AND PRACTICES IN RUTHERFORD COUNTY MIDDLE SCHOOLS

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Abstract

The purpose of this study was to examine administrators' and teachers' perceptions of the processes and practices of Response to Intervention and Instruction, or RTI2, in middle schools in Rutherford County Tennessee. This study also investigated the differences among teachers' perceptions based on their level of education (i.e., degree earned). The participants in this study included 140 administrators and teachers employed by the Rutherford County School district in Middle Tennessee. Data were collected via an online survey comprised of two sections (55 items) and a set of

demographic questions. A Mann-Whitney U-Test was used to determine if there were any significant differences in mean rank scores between each of the constructs (processes and practices) based on position (teachers and administrators), and a Kruskal-Wallis H-test was conducted to determine if there were differences in mean rank scores among the constructs (processes and practices) by teachers' level of education (i.e., Bachelors, Masters, and advanced degrees). Among the major findings included the following: (a) administrators' and teachers' perceptions of RTI2 are quite similar; (b) differences in perceptions between administrators and teachers exist only within the construct of processes; and, (c) despite educational level of teachers (i.e., degree earned), teachers have similar perceptions of both processes and practices. A statistically significant difference was found for one area: perceptions of the processes of RTI2. Administrators have significantly higher means for the construct of processes, by .31. Recommendations for practitioners include the need for continued Professional Development for teachers and the continued pursuance of administrators gaining buy-in from their teachers to increase efforts of implementation.

TEACHERS' PERCEPTIONS OF ALTERNATIVE PRACTICES AND EXCLUSIONARY DISCIPLINE

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Abstract

The purpose of this study was to investigate the perceptions of Williamson County (WCS) middle and high school teachers in utilizing Positive Behavior Intervention Support (PBIS) and Classroom Organization Management Program (COMP) in successfully dealing with (a) student misbehavior, (b) academic achievement, (c) student engagement, and (d) personal satisfaction teaching. Moreover, this study examined the correlation between training on PBIS and COMP and teacher perceptions of their ability to deal with student misbehavior, increase student engagement, and increase academic achievement. Finally, the study investigated WCS teachers' perceptions on the use of PBIS and COMP in reducing the occurrence of exclusionary discipline in the classroom.

A total of two schools were conveniently selected and investigated during the 2016-2017 school year, which were Grassland Middle School and Franklin High School. The total target population of the two schools was 207 teachers. This includes 92 middle school teachers and 115 high school teachers. The results of the null hypotheses testing using the Chi Square analysis found statistically significant differences between middle and high school teachers' perceptions on PBIS and COMP on five of the null hypotheses. Middle school teachers had a statistically significant difference than high school teachers on the statements regarding PBIS and COMP, meaning that they believed the programs to be effective.

High school teachers had a statistically significant difference on PBIS in dealing with student academics, student engagement, training and ability in student behavior and engagement and PBIS working to reduce the occurrence of exclusionary discipline. There are several areas where there were no statistically significant differences in high school teachers on PBIS. Overall, high school teachers perceived some parts of PBIS to be beneficial, but middle school found all parts beneficial. Unlike PBIS, high school teachers believed that COMP works to reduce the occurrence in exclusionary discipline and all of the aforementioned areas as well. There was no statistically significant correlation found between the number of days of training in PBIS that teachers received and their ability to deal with student misbehavior, student academic achievement and student engagement.

EFFECTIVENESS OF WIDA ENGLISH LANGUAGE DEVELOPMENT STANDARDS MEETING PROFICIENCY FOR ENGLISH LANGUAGE LEARNERS

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Abstract

The purpose of this study was to determine the effectiveness of World Class Instruction Design and Assessment (WIDA) English Language Development Assessment (ELDA) standards when compared to the previous ELDA standards and the progress made by English language learners toward English proficiency. This evaluation was prompted by the federal mandate that all English language learners (ELLs) would become proficient in the English Language Arts (ELA) areas of reading, writing, listening, and speaking. The state of Tennessee implemented educational standards for ELL students after the No Child Left Behind Act induction by composing the ELDA standards. When Tennessee adopted the Common Core State Standards (CCSS), a more rigorous set of standards were needed to develop ELL proficiency more quickly while students learned the academic vocabulary. The State of Tennessee adopted the WIDA standards and assessment—Assessing Comprehension and Communication in English State-to-State for English Language Learners (ACCESS for ELLS 2.0)—to monitor ELL progress and to report annual measurable achievement objectives (AMAOs). This study focused on the comparative progress of the ELDA standards and WIDA standards for third, fourth, and fifth grade ELL students by comparing ELDA 2012-2014 ELA composite scores to ACCESS for ELLs 2.0 2014-2016 from the four selected elementary schools. The study also analyzed a comparative difference between genders using the 2015-2016 ELA composite scores for ELL students in third, fourth, and fifth grades in the four selected elementary schools. The researcher compared these variables by using the Statistical Program for the Social Sciences, Version 22.0. The researcher analyzed the collected archival test data using chi-square to determine that the 2012-2013 ELDA ELA composite scores did not have any students reaching the proficiency level. The researcher ran other descriptive tests to display data that could be used to validate if the WIDA standards are more effective than the previous ELDA standards in advancing ELL students to English proficiency. The researcher did validate in the study that the WIDA standards are more effective than the ELDA standards. For the last 2 years of ELDA, a total of 404 ELL students were tested. Only two students reached proficiency. In the first 2 years of WIDA, a total of 496 ELL students were tested. Out of these students, 211 reached proficiency. Thus, this study determined that the WIDA standards are effective in the instruction of ELL students.

INTER-RATER RELIABILITY AMONG PRINCIPALS USING THE INSTRUCTIONAL DOMAIN OF THE TENNESSEE EDUCATOR ACCELERATION MODEL

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Abstract

Highly qualified and effective teachers play a significant role in student achievement. Teacher evaluations are administered for the purpose of determining the competency of the teacher while providing opportunities for professional development and growth. The recent focus on securing effective teacher evaluation systems has elevated the need for a more equitable process of teacher evaluation. Although raters are being trained, concerns about individual raters being either too lenient or strict have arisen. The problem that prompted this study was the lack of consistency among evaluators using the Tennessee Educator Acceleration Model (TEAM) to evaluator teachers. The range in scores received by principals and teachers being evaluated using TEAM depends on the evaluator and the circumstances. The purpose of this quantitative correlational study was to determine the levels of inter-rater reliability

that existed among elementary education evaluators on the Instructional Domain of the TEAM in school districts in Tennessee currently using TEAM. The study also examined the effectiveness of the evaluator training offered by the district by comparing the Instructional Domain scores of those evaluators who attended the training to those who did not. A reliability analysis, using the Cronbach's alpha values, was conducted to examine whether was internal consistency in the Instruction Domain components of the TEAM General Education Rubric while a correlation analysis was conducted to examine the inter-rater reliability on the Instructional Domain of the TEAM among evaluators who have participated in evaluator training than those who have not participated in the training. The degree of inter-rater reliability for principals evaluating a pre-service teacher yielded a Cronbach's alpha of .900. A statistical finding of .900 indicates that inter-rater reliability was high among principals using TEAM to evaluate the Instruction Domain of TEAM. An analysis of the effect that TEAM training had on the inter-rater reliability of the evaluators could not be performed due to the fact that only one participant did not receive the training. Evaluators and teachers would benefit from this study on inter-rater reliability among evaluators as it examines the rationale for the level of agreement and reasons for inconsistent ratings. This would in turn lead to a more equitable evaluation system.