Montessori Memo

Quarterly, Curated, and Collaborative
Research for practitioners, researchers, and community members

MONTESSORI MEMO™

A quarterly, curated memo of peer reviewed research and policy papers accessible and contributed to by a broad community of Montessori and non-Montessori researchers and practitioners via our virtual community found in the ***Montessori Forward*** app.

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The Center for Montessori Studies collaborates across the Montessori community, Association Montessori International and American Montessori Society, and values the institutional collaborations with and among KU Center for Montessori Research, National Center for Montessori in the Public Sector, and Montessori Public Policy Initiative.

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Existing with COVID-19

Never more than in this moment does our work in education seem more relevant. It is evident we need all of our human capacity, the very capacity that Montessori education and theory believe in and nurtures. We at the Center for Montessori Studies hope everyone is taking care during this unimaginable time of COVID-19.

RESEARCH: MONTESSORI

Title Design and Validation of Learning Sequences of PGSD Sanata Dharma University Student to Teach the Fraction Concept for Primary Student Using Montessori Manipulatives

Citation

Aprinastuti, C., & Amelia, M. A. (2020). Design and validation of learning sequences of PGSD Sanata Dharma University student to teach the fraction concept for primary student using Montessori manipulatives. *Journal of Physics: Conference Series*, *1470*, 012083. doi.org/10.1088/1742-6596/1470/1/012083

Summary/Abstract Fraction concept is one of the learning problems that often occurs in elementary students. Elementary student's misconceptions can be caused by teacher's misconceptions. PGSD students are teacher candidates, so they must have the correct concept then they can teach the concept of fractions correctly too. Learning must be an inspiration for students when they become teachers later. One medium that can be used to teach fraction concepts is media based on Montessori. Local culture can support the use of Montessori media. This study aims to design and validate the learning sequence of PGSD Students in using Montessori media, to develop design principles to teach fraction concepts in elementary school students.

The approach in this research is design research which includes three phases, namely design, trial and assessment. In the design phase, researchers formulate students' prior knowledge and learning objectives. This is used as the basis for the sequence of learning. This stage of learning is evaluated in a repeat trial phases, the hypothesis design principle is developed and from which the learning stages are redesigned. The results of the assessment phase, together with the experience of the previous cycle and research review, are used to perfect the design principles of the student's learning sequences so they can teach the concept of fractions correctly.

Title Effect of Intervention Guided by Montessori Method on Improving Feeding Capacity of Patients with Dementia

Citation

Zhengjun Chen, H. Y. (2020). Effect of intervention guided by Montessori Method on improving feeding capacity of patients with dementia. *Internationl Journal of Clinical and Experimental Medicine*, *13*(2), 1148–1155. Retrieved from http://www.ijcem.com/files/ijcem0104096.pdf.

Summary/Abstract This study was designed to analyze the effects of intervention guided by Montessori Method on patients with dementia. Methods: 85 patients diagnosed with Alzheimer's disease (AD) in our hospital were included for retrospective analysis and were divided into 2 groups by double-blind randomized method. The control group (n=42) received routine guides on dieting, and the observation group (n=43) was intervened under the guides of Montessori Method. The 2 groups were compared for cognitive function, feeding capacity score, feeding difficulty, voluntary feeding time, and nutriture. Results: (1) After intervention, the observation group yielded a higher MMSE score for cognitive function than the control group (P<0.001); (2) The scores of feeding capacity in both groups achieved increase, which in the observation group was higher than that in the control group 1 month after intervention (P<0.001); (3) The scores of feeding difficulty in both groups achieved decrease, which in the observation group was lower than that in the control group after intervention (P<0.001); (4) For voluntary feeding time as intervention completed, 1 month and 3 months after intervention, the observation group reported prominent extension (P<0.001) while the control group achieved shortening gradually (P<0.001), and the voluntary feeding time in the observation group was longer than that in the control group (P<0.001). Conclusion: Intervention guided by Montessori Method helps patients with dementia by reducing their feeding difficulty and improving their cognitive function, feeding capacity, and nutriture. It is a method deserving popularization.

Title A Montessori-based Approach to Treat Behavioral and Psychological Symptoms in Dementia

Citation

Tschanz, J. T., & Hammond, A. G. (2020). A Montessori-based approach to treat behavioral and psychological symptoms in dementia. *International Psychogeriatrics*, *32*(3), 303–306. doi.org/10.1017/S1041610220000149

Summary/Abstract Pharmacological treatments are modest in efficacy and depending on the class of medications, accompanied by undesirable side effects that may further cloud cognition, increase sedation, produce physical symptoms or discomfort, or increased risk of death (Kales et al., 2015). [...]non-pharmacological approaches are often sought as the first line of defense in treating BPSD (Kales et al., 2015). The challenges of designing an effective non-pharmacological intervention for BPSD include consideration of the complexities associated with dementia: the degree of severity of cognitive and functional impairment, the progressive nature of decline, and the individual's characteristics including sensory and/or motor limitations, health concerns, premorbid personality, and personal interests and life experiences.

Observational studies support aspects of this model. [...]the rate of cognitive or functional decline has been associated with vascular risk factors and conditions (Mielke et al., 2007), health status (Leoutsakos et al., 2012), malnutrition (C. Sanders et al., 2016), (C. L. Sanders et al., 2018), cognitive stimulation (Treiber et al., 2011), caregiver coping strategies (Tschanz et al., 2013), and closeness of the caregiver–care recipient relationship (Norton et al., 2009).

RESEARCH: RELATED

Title Is There a Need for Handicraft in Preschool? Attitudes of Preschool Teachers and Parents on Including Handicraft Activities in the Regular Preschool Program

Citation

Benić Marijana Županić, & Jambrešić Ivna. (2020). Is there a need for handicraft in preschool? Attitudes of preschool teachers and parents on including handicraft activities in the regular preschool program. *Proceedings of INTED2020 Conference*, 1511–1519. doi: 10.21125/inted.2020

Summary/Abstract Alternative educational concepts have evolved in response to classical educational methods in which children are placed in a passive position and the transfer of knowledge is cultivated as a form of teaching. Models of alternative pedagogy (Montessori, Waldorf, Reggio, Agazzi) advocate developmentally appropriate practices which Bredekamp [1] describes as a presence of different strategies, i.e., child-oriented behaviours of teachers and responding to the child's individual needs. In order to help each child to grow into a universal and competent individual from preschool age, it is necessary to encourage their imagination and creativity, as well as to acquire habits of cooperation and coexistence with other children. One of the activities which promote these desirable characteristics in children is handicraft. Many studies and findings in the area of neuroscience, multiple intelligences theories, and the aforementioned alternative pedagogical concepts emphasize the importance of handicraft and point out its benefits not only for children but for the entire community. However, such an approach to children's learning and activity is poorly represented in educational institutions. Therefore, the aim of the study was to examine the views of preschool teachers and parents on handicraft activities and its more frequent use in regular preschool programs. The survey was conducted by an anonymous questionnaire on a sample of 316 respondents, preschool teachers (N=141) and parents (N=175). The results of the study show that both preschool teachers and parents agree that certain elements of alternative concepts such as handicraft have a positive impact on the overall development of the child and that they are useful and practical life skills. They also agree that handicraft activities should be used in educational institutions to a greater extent.

Title Multisensory Gains in Simple Detection Predict Global Cognition in Schoolchildren

Citation

Denervaud, S., Gentaz, E., Matusz, P. J., & Murray, M. M. (2020). Multisensory gains in simple detection predict global cognition in schoolchildren. *Scientific Reports*, *10*(1), 1394. doi.org/10.1038/s41598-020-58329-4

Summary/Abstract The capacity to integrate information from different senses is central for coherent perception across the lifespan from infancy onwards. Later in life, multisensory processes are related to cognitive functions, such as speech or social communication. During learning, multisensory processes can in fact enhance subsequent recognition memory for unisensory objects. These benefits can even be predicted; adults' recognition memory performance is shaped by earlier responses in the same task to multisensory – but not unisensory – information.

Everyday environments where learning occurs, such as classrooms, are inherently multisensory in nature. Multisensory processes may therefore scaffold healthy cognitive development. Here, we provide the first evidence of a predictive relationship between multisensory benefits in simple detection and higher-level cognition that is present already in schoolchildren. Multiple regression analyses indicated that the extent to which a child (N = 68; aged 4.5–15years) exhibited multisensory benefits on a simple detection task not only predicted benefits on a continuous recognition task involving naturalistic objects (p = 0.009), even when controlling for age, but also the same relative multisensory benefit also predicted working memory scores (p = 0.023) and fluid intelligence scores (p = 0.033) as measured using age-standardised test batteries. By contrast, gains in unisensory detection did not show significant prediction of any of the above global cognition measures. Our findings show that low-level multisensory processes predict higher-order memory and cognition already during childhood, even if still subject to ongoing maturation. These results call for revision of traditional models of cognitive development (and likely also education) to account for the role of multisensory processing, while also opening exciting opportunities to facilitate early learning through multisensory programs. More generally, these data suggest that a simple detection task could provide direct insights into the integrity of global cognition in schoolchildren and could be further developed as a readily-implemented and cost-effective screening tool for neurodevelopmental disorders, particularly in cases when standard neuropsychological tests are infeasible or unavailable.

Title A Neuroscience-Based Learning Technique: Framework and Application to STEM

Citation

Dorantes-González, D. J., & Balsa-Yepes, A. (2020). A neuroscience-based learning technique: Framework and application to STEM. *International Journal of Educational and Pedagogical Sciences*, *14*(3), 197–200. doi.org/doi.org/10.5281/zenodo

Summary/Abstract Existing learning techniques such as problem-based learning, project-based learning, or case study learning are learning techniques that focus mainly on technical details, but give no specific guidelines on learner's experience and emotional learning aspects such as arousal salience and valence, being emotional states important factors affecting engagement and retention. Some approaches involving emotion in educational settings, such as social and emotional learning, lack neuroscientific rigorousness and use of specific neurobiological mechanisms. On the other hand, neurobiology approaches lack educational applicability. And educational approaches mainly focus on cognitive aspects and disregard conditioning learning. First, authors start explaining the reasons why it is hard to learn thoughtfully, then they use the method of neurobiological mapping to track the main limbic system functions, such as the reward circuit, and its relations with perception, memories, motivations, sympathetic and parasympathetic reactions, and sensations, as well as the brain cortex. The authors conclude explaining the major finding: The mechanisms of nonconscious learning and the triggers that guarantee long-term memory potentiation. Afterward, the educational framework for practical application and the instructors' guidelines are established. An implementation example in engineering education is given, namely, the study of tuned-mass dampers for earthquake oscillations attenuation in skyscrapers. This work represents an original learning technique based on nonconscious learning mechanisms to enhance long-term memories that complement existing cognitive learning methods.

Title Rethinking Design Studios as an Integrative Multi-Layered Collaboration Environment

Citation

Park, S. (2020). Rethinking design studios as an integrative multi-layered collaboration environment. *Journal of Urban Design*, 1–28. doi: 10.1080/13574809.2020.1734449

Summary/Abstract This paper discusses experimental studios within an incremental collaboration framework to better understand the opportunities of peer-to-peer learning and student collaboration. Using qualitative methods including observation, interviews, peer-evaluations, and descriptive assessments of student work, the study revealed that collaboration can lead to both progression and regression in overall learning processes depending on the approach (mandatory/self- directed), group composition, and how students arrive at common decisions. The findings suggest that a strategically designed studio structure combined with multiple, diversified collaboration strategies are essential to give students successful learning experiences in both explicit and tacit forms.

Title Promoting Learners' Autonomy at Elementary Level through Experiential Learning: A Quantitative Study

Citation

Zaidi, N. H., Khan, N., & Oad, L. (2020). Promoting learners' autonomy at elementary level through experiential learning: A quantitative study. *Journal of Elementary Education*, *29*(2), 162–177. Retrieved from http://journals.pu.edu.pk/journals/index.php/jee/article/viewFile/1462/846.

Summary/Abstract This research aims to ascertain Learners' Autonomy through Experiential Learning of elementary students at class 8 level in a role play activity conducted at a private sector English Medium School. Experiential Learning could be a learner-friendly apparatus that has not been enough investigated at the basic level. Most writings and researches are recognized the significance of "learning through doing", "hands-on approaches" or "Experiential Learning". Experiential Learning has developed in notoriety with grown-up learners since Dewey and a number of researches examining the potential benefits of utilizing Experiential Learning Strategies. It plays vital role in educational institutions. In depth, analysis of the literature review was done. Hypothesis was formulated, the strategy of the research was survey. The population of the study was the students of elementary private schools of Karachi. Simple random sampling design was adopted. The sample size is consisted of118 students as participants respectively. Two questionnaires were adopted; Experiential Learning Scale (ELS) by Clem & Beasley and Learner Autonomous Scale (LAS) by Fletcher & Averill for data collection. Data was analyzed by applying inferential statistics with the correlation and linear regression through SPSS. It was found that the value of "r" between the Experiential Learning and Learner Autonomous is .989, it indicates high correlation exists between (EL) and (LA) variables. Overall relation of all the categories of Experiential Learning and Learner Autonomous were found moderate at 0.05 level of significance. The overall linear regression model suggests that there is only R2 =.331, P < .05 variation on Learner Autonomous because of Experiential Learning. Based on finding of this research, practitioners and instructors can utilize Experiential Learning as a part of their own teaching methodologies. It is also recommended that through this process, the concept of Autonomous Learning be observed further; while a comparative study can also be initiated to ascertain how the process affects students' involvement in differing curricula.

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