DOWNLOAD PDF THE INFLUENCE OF COGNITIVE MOTIVATIONAL FACTORS ON THE REPRODUCTION, LEARNING, AND PERFORMANCE

Chapter 1 : How motivation affects academic performance: a structural equation modelling analysis

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You may often hear about a lack of motivation at school or at work, where people have difficulty studying, doing homework, staying focused, or getting work done, but the same kids have no problem learning all Pokemon. Motivation is an internal impulse that brings us to complete an action. Without motivation, there is no action. Motivation is important because it is what causes us to actively look for resources to guarantee our success. While some motivation requires a conscious effort, others, like looking for food, eating, and finding a sexual partner are innate motives that we are born with and allow us to stay alive. You might find that sitting through English class was a breeze, but your classmate struggled to read all of the books in time for the exam. Maybe you can learn a recipe with ease, or maybe you learned how to build an engine on your own. These kinds of tasks show your motivation to learn and can highlight an important part of your learning process. Motivation may come from your own interest, or it may come out of necessity having to learn something for work or survival, like changing a car tire. In this aspect, we can talk about two different types of motivation: This kind of motivation occurs when you are internally motivated to do something because you believe that it is important or because you enjoy doing it. Students with this kind of motivation will be happy and excited to do their homework because they find it an exciting challenge, even though they might not receive any reward or compensation. Intrinsic motivation may wane through schooling as children are required to learn subjects that may be of little or no interest to them. This kind of motivation is when a student wants to study or learn because of external factors, like punishment or reward. The Importance of Motivation in education Motivation is the impulse that brings us to carry-out and achieves what we propose and plays a large role in learning. According to a study , motivation influences math performance more than IQ. Researchers found that while IQ is a factor in the successful acquisition of math, it mostly applies to the basic concepts that you learn in early schooling. Motivation and study skills become more of a determining factor as you continue to develop math skills. The students that felt competent were intrinsically motivated to learn, and used skills like explaining, synthesizing, and making connections to other materials, while avoiding memorization. The Importance of Motivation: Why is it pertinent to keep children motivated to learn? Motivation improves persistence and effort Motivation improves initiative Motivation improves overall performance The Importance of Motivation: According to Rodriguez Moneo , behavior can be an accurate barometer for motivation. The importance of motivation and measuring it in students is key in a successful learning environment. Check for these signs to see if your students are motivated. Preference or choice of one choice over another. If I choose to watch TV instead of doing my homework, my choice will reflect my motivation level. Latency, or the time it takes to create a response to a stimulation. The longer it takes you to do a task, the less motivation. The more physical and cognitive resources invested in the task, the more motivation there is. There is usually more motivation when the takes longer to finish a task and do it well. The sooner you give up, the less motivated you are. Expressive indicators of emotions. Actions are usually accompanied by emotional expressions that indicate pleasure or displeasure that the action causes. Watch a motivational video from a person that dropped out of high school and then realized that through education anything is possible. The importance of Motivation: How can you improve motivation in the classroom? Attitude influences motivation Research has shown that the interaction between her and student is more important than structural factors like educational materials or class size. This relationship between student and teacher begins when they start school and is just as important as the student advances and the academic challenges become more difficult. How can you promote motivation?: Create ties and connect with your students. Make sure they know that you care about them and their academic success. Give students responsibilities and make participating in class fun. Give each student a task, like keeping the classroom organized, cleaning the whiteboard, handing out material, etc. Recognize little wins and

reward them. In the classroom, this may mean special privileges or little things like stickers. For example, you could give one reward a day in Kindergarten, but should wait about a week for older children. Rather than objects, give them a smile or a high five. Kids are especially used to technology and the constant stimulation of games. Teach using games and activities, have them argue and interact with one another. Passive learning is not only boring, but has been shown to be ineffective. Think about using photographs, videos, movies, murals, etc. You can create an introduction to each section that talks about real-world application. Using names and labels like these can damage their self-esteem and make them feel useless. Try to avoid using negative labels, and instead talk about their strengths. Use CogniFit, leader in brain-based learning platforms Brain-based learning is based on a new vision for learning, which takes cognitive research and applies it to the classroom, allowing to analyze and improve learning processes. CogniFit is a leader in brain-based learning and has a program that was specifically designed for educators around the globe. What are the different parts of the brain? The program and activities are easy to use and fun for the user. By improving some cognitive skills, the student has a better chance of performing well in school and thus improving motivation. How can you improve motivation?: Making mistakes helps you learn better and think of new ways to solve a certain problem. Is it going to help them in the real world? Will it be important when they go to college? Will it benefit them in their day-to-day lives? Do you have any questions?

Chapter 2 : Predicting Mathematical Performance: The Effect of Cognitive Processes and Self-Regulation I

The influence of cognitive motivational factors on the reproduction, learning, and performance of preselected and constrained movements / Article Â· January Cite this publication.

This is an open access article distributed under the Creative Commons Attribution License , which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. Abstract A substantial number of research studies have investigated the separate influence of working memory, attention, motivation, and learning strategies on mathematical performance and self-regulation in general. There is still little understanding of their impact on performance when taken together, understanding their interactions, and how much each of them contributes to the prediction of mathematical performance. With the emergence of new methodologies and technologies, such as the modelling with predictive systems, it is now possible to study these effects with approaches which use a wide range of data, including student characteristics, to estimate future performance without the need of traditional testing Boekaerts and Cascallar, This research examines the different cognitive patterns and complex relations between cognitive variables, motivation, and background variables associated with different levels of mathematical performance using artificial neural networks ANNs. A sample of entering university students was used to develop three ANN models to identify the expected future level of performance in a mathematics test. These ANN models achieved high degree of precision in the correct classification of future levels of performance, showing differences in the pattern of relative predictive weight amongst those variables. The impact on educational quality, improvement, and accountability is highlighted. Introduction Although there is substantial research which has investigated the influences of a working memory [1 â€” 11]; b attentional systems [12 , 13], and c motivation [14 â€” 20], on mathematical performance and self-regulation in general, these studies have looked at the separate effects of these components. Therefore, we have little understanding and data about how they impact performance when taken together, understanding their interactions, and how much each can predict the mathematical performance in an integrated model [21 , 22]. New methodologies and technologies, and the emergence of predictive systems, have focused on the possibility of assessments which use a wide range of data or student productions to estimate future student performance without the need for traditional testing [23]. Artificial neural networks ANNs have been used in several different fields of research and in applied environments, such as biology [24], business [25], finance [26], medicine [27], defense [28], meteorology and environmental studies [29], and in the prediction of terrorist attacks [30]. During the last few decades, ANNs have been increasingly utilized as a statistical methodology in applied areas such as classification and recognition of patterns in business, finance, and the social sciences [25 , 31 â€” 35]. However, the literature shows very few studies applying neural networks in education and in educational assessment in particular [36 , 37]. Some authors have suggested that traditional statistical methods do not always yield accurate predictions [38]. Finally, in order to compare the predictive power of this ANN-based approach with more classical statistical methods, discriminant analyses were used. Working Memory Capacity and Mathematical Performance A large body of literature shows working memory as a very important construct in several areas, and several studies have shown its important role in a wide range of complex cognitive behaviors, such as comprehension, reasoning, and problem solving [41]. Working memory WM is an important predictive variable of intellectual ability and academic performance, consistent over time [1 â€” 11 , 21 , 22 , 42 , 43]. Nevertheless, it is still not understood precisely how this basic cognitive mechanism influences specific performance and how it is related to performance levels in particular areas, as is the case with mathematical performance. Working memory capacity refers to the temporary representation of information that was just experienced or just retrieved from long-term memory but no longer exists in the external environment, and it will be operationalized by the overall measure of the automated operation span [44]. Internal representations are short-lived, but can be maintained for longer periods of time through active

rehearsal strategies, and can be subjected to operations that manipulate the information in such a way that it becomes useful for goal-directed behavior. The term working memory is applied to a system of limited capacity, which is capable of storing and handling information necessary for the performance of complex tasks such as learning, comprehension, and reasoning [45]. There are several paradigms to examine the role of working memory in complex tasks. One important approach examines it from the perspective of individual differences, using various working memory span tasks as a research tool [46 â€” 49]. These span tasks reading, operation, and spatial spans are designed to resemble the working memory demands during the performance of complex cognitive tasks by placing simultaneous demands on both processing and storage. Individual differences in WM influence the performance in complex tasks [50 , 51]. It is possible to assume that task complexity has an influence on performance because the increase of complexity demands a greater level of activation for retrieval of information from declarative memory [50]. Mathematical cognition involves complex mechanisms or processes such as identification of relevant quantities, encoding into an internal representation, mental comparisons, and calculations [52]. These cognitive activities are encompassed by working memory. Despite the level of agreement regarding the close relationship between working memory and mathematics processing and learning, further studies on the role of working memory in mathematical cognition are necessary to better understand the participation of task and subject characteristics in the modulation of performance in mathematical processing and learning [1 , 53]. There is some supportive but not extensive literature on the critical role of working memory in mathematical performance [54]. Working memory is related to a variety of numerical and mathematical abilities used for counting, which underlie the solution of simple addition and subtraction problems [2 â€” 4 , 6 â€” 8 , 11] in [1 , 5 , 9 , 10 , 55], as well as the solution of complex arithmetic problems [50 , 51]. These children have difficulty in holding information in memory while performing another activity e. Furthermore, they perform poorly in measures of the visuospatial working memory and the central executive [61 , 64 â€” 67]. However, they do not show particular problems in phonological working memory tasks [60 , 67]. Interesting areas of this approach include the model of mental algebra [50] and reasoning and problem solving [68]. Attention and Mathematical Performance In cognitive models, attention has been traditionally involved in the control of intended actions. In this sense, attentional control has been identified as an important domain in self-regulation [12 , 13]. Specifically, attention problems have been related to mathematical performance. Inattention is considered as a risk factor for poor math achievement [69]. Other studies have found a low predictive power of attention considering it together with depressive symptoms and anxiety [71]. However, most of those studies have used classical multiple regression analysis to predict mathematical performance. Current research findings suggest that attention involves different mechanisms which involve separate brain areas. In particular, attention encompasses three subsystems: The orienting network allows the selection of information from sensory input, the alerting network refers to a system that achieves and maintains an alert state, and executive control is responsible for resolving conflict among responses [72]. Executive control has been closely related to working memory capacity [73]. Self-Regulation of Learning and Mathematical Performance Previous research on self-regulated learning focuses primarily on the learning strategies that students need to use in order to guide their learning [23]. Therefore, this study analyzes both learning strategies as motivational components of self-regulation. Learning strategies LSs involve any thoughts or behaviors that help the students to acquire new information and integrate these in their existing knowledge [76 â€” 79]. LS also help students retrieve stored information. Examples of LS include summarizing, paraphrasing, imaging, creating analogies, note taking, and outlining [77]. Motivational self-regulation includes motivational beliefs, motivation strategies, and motivational regulatory strategies. Domain-specific self-efficacy beliefs influence effort investment, and not the other way round [80]. Research shows that epistemic and motivational beliefs that students hold play an important role in self-regulation [16 , 81 , 82]. Shoenfeld [83] recognized the existence of a system of beliefs that influences the mathematics problem-solving behavior. Several studies have identified beliefs about mathematics as a discipline, about the learning of mathematics, and about the

social context of mathematical activities [19 , 20]. Other categories of beliefs have been identified about the self in relation to mathematical learning: Neural Networks and Performance Conceptually, a neural network is a computational structure consisting of several highly interconnected computational elements, known as neurons, perceptrons, or nodes. Each neuron carries out a very simple operation on its inputs and transfers the output to a subsequent node or nodes in the network topology [89]. Neural networks exhibit polymorphism in structure and parallelism in computation [90], and it can be construed as a highly connected structure of processing elements that attempts to mimic the parallel computation ability of the biological brain [91 â€” 94]. Predictive streams analyses [21], based in this case on neural network ANN models, have several strengths: As such, this technique is able to model nonlinear and complex relationships among variables. ANNs aim to maximize classification accuracy and work through the data in an interactive process until maximum accuracy is achieved, automatically modeling all interactions among variables; b ANNs are robust, general function estimators. They usually perform prediction tasks at least as well as other techniques and sometimes perform significantly better [95]; c ANNs can handle data of all levels of measurement, continuous or categorical, as inputs and outputs. Because of the speed of microprocessors in even basic computers, ANNs are more accessible today than they were when originally developed. The ANN learns by examining individual training case, then generating a prediction for each testing case, and making adjustments to the weights whenever it makes an incorrect prediction. Information is passed back through the network in iterations, gradually changing the weights. As training progresses, the network becomes increasingly accurate in replicating the known outcomes. This process is repeated many times, and the network continues to improve its predictions until one or more of the stopping criteria have been met. A minimum level of accuracy can be set as the stopping criterion, although additional stopping criteria may be used as well e. Once trained, the network can be applied to future cases validation or holdout sample for validation and implementation [96]. Measures to Evaluate the Neural Network System Performance In order to evaluate the performance of the neural network system, there are a number of measures used which provide a means of determining the quality of the solutions offered by the various network models tried. The traditional measures include the determination of actual numbers and rates for true positive TP , true negative TN , false positive FP , and false negative FN outcomes, as products of the ANN analysis. In addition, certain summative evaluative algorithms have been developed in this field of work, to assess overall quality of the predictive system. These overall measures are Recall, which represents the proportion of correctly identified targets, out of all targets presented in the set, and is represented as ; Precision which represents the proportion of correctly identified targets, out of all identified targets by the system, and is represented as. Two other measures have been used to report the characteristics of the detection sensitivity of the system. One of them is Sensitivity similar to Recall: The other is Specificity, defined as the proportion of correctly rejected targets from all the targets that should have been rejected by the system and which is expressed as. In addition, the evaluation of ANN performance is carried out with a summative measure, which is used to account for the somewhat complementary relationship between Precision and Recall. Such a definitional expression of F1 assumes equal weights for Precision and Recall. Method The sample included university students, of both genders, ages between 18 and 25, enrolled in the first year in several different disciplines psychology, engineering, medicine, law, social communication, business, and marketing , in three universities, during the academic year. Attention Network Test ANT [72] This task provides a measure for each of the three anatomically defined attentional networks: Participants are asked to determine when a central arrow points left or right. They were instructed to focus on a centrally located fixation cross throughout the task and to respond as quickly and accurately as possible. During the practice trials, but not during the experimental trials, subjects received feedback from the computer on their speed and accuracy. The practice trials took approximately 2 minutes, and each of the three experimental blocks was approximately 5 minutes long. The whole experiment took about twenty minutes. The measure for general attention is the average response time regardless of the cues or flankers. To analyse the effect of the three attentional networks, a set of cognitive subtractions described by Fan et al. The efficiency of the three

attentional networks is assessed by measuring how response times are influenced by alerting cues, spatial cues, and flankers [72]. The alerting effect was calculated by subtracting the mean response time of the double-cue conditions from the mean response time of the no-cue conditions. For the orienting effect, the mean response time of the spatial cue conditions up and down was subtracted from the mean response time of the centre cue condition. Finally, the effect of the executive control conflict effect was calculated by subtracting the mean response time of all congruent flanking conditions, summed across cue types, from the mean response time of incongruent flanking conditions [72]. Automated Operation Span [44] This is a computer-administered version of the Ospan instrument [44] that measures working memory capacity. The responses were collected via click of a mouse button. The task took approximately 20â€”25 minutes to complete [44]. Learning Strategies Questionnaire [77 â€” 79] A validated Spanish version was administered. It examines how facilitative or debilitative their approach to college and academics is for helping them get their work done and for succeeding in college sample item: I feel confused and undecided as to what my educational goals should be.

Chapter 3 : Cognitive Theories of Motivation

Goal-Setting Theory. Another cognitive theory of motivation, the Goal-Setting Theory was proposed by Edwin Locke in the s. The theory explains that goal setting has an influence on task performance.

Find articles by C. Croiset Find articles by G. Received Oct 3; Accepted Jan Abstract Few studies in medical education have studied effect of quality of motivation on performance. Self-Determination Theory based on quality of motivation differentiates between Autonomous Motivation AM that originates within an individual and Controlled Motivation CM that originates from external sources. To determine whether Relative Autonomous Motivation RAM, a measure of the balance between AM and CM affects academic performance through good study strategy and higher study effort and compare this model between subgroups: Data on motivation, study strategy and effort was collected from medical students of VU University Medical Center Amsterdam and their academic performance results were obtained from the student administration. Structural Equation Modelling analysis technique was used to test a hypothesized model in which high RAM would positively affect Good Study Strategy GSS and study effort, which in turn would positively affect academic performance in the form of grade point averages. This model also fitted well for all tested subgroups of students. Differences were found in the strength of relationships between the variables for the different subgroups as expected. In conclusion, RAM positively correlated with academic performance through deep strategy towards study and higher study effort. This model seems valid in medical education in subgroups such as males, females, students selected by qualitative and weighted lottery selection. Autonomous motivation, Controlled motivation, Study strategy, Study effort, Academic performance, Self-determination theory Introduction Motivation has been shown to positively influence study strategy, academic performance, adjustment and well-being in students in domains of education other than medical education Vansteenkiste et al. Studying motivation particularly in medical students is important because medical education is different from general education in several aspects, some of them being high intensity of study, the requirement to carry out clinical work along with study and the need to follow a highly specifically defined path to be able to qualify to practice as doctors. In a literature review we found that the positive correlation between motivation and performance has not been substantiated strongly in medical education as different studies have contradictory findings Kusurkar et al. The objective of the present research study was to explore the relationships between motivation, study strategy, study effort and academic performance among medical students. There are different theories of motivation; some focus on quantity of motivation and others on quality. Quantity of motivation could be high or low. Quality of motivation depends on whether the source of motivation is internal or external. Self-determination Theory SDT of motivation considers quality of motivation to be more important than quantity and describes a continuum for quality of motivation Ryan and Deci a , b. This ranges from intrinsic motivation at one end to amotivation at the other end of the continuum, with four types of extrinsic motivation integrated regulation, identified regulation, introjected regulation, external regulation in between. Intrinsic motivation is derived out of genuine interest in an activity. Extrinsic motivation is derived out of an expected gain or a separable outcome. As elaborated by SDT, not all types of extrinsic motivation are undesirable. Extrinsic motivation spans from high self-determination to low self-determination see Fig. Identified Regulation, the highly autonomous type of extrinsic motivation, is close to intrinsic motivation. Identified regulation and intrinsic motivation can be summed up to generate Autonomous Motivation AM. Thus AM depicts self-determined motivation. Introjected and external regulation, which are low in self-determination, can be summed up together to generate Controlled Motivation CM. Thus CM depicts motivation which is very low on self-determination.

Chapter 4 : Importance of Motivation: What Is It and Tips to Promote It

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Describe observational learning by identifying three factors that influence modeling, four processes that enter into observational learning and the role of reinforcement in observational learning. Bandura believes that most human behavior is learned through observation and modeling.