FACTORS AFFECT THE COGNITIVE LEARNING OF STUDENTS IN SICHUAN, CHINA.

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Abstract

This study explores the various factors influencing cognitive learning among students in primary schools in Leshan, Sichuan, China. The objective is to identify these contributing elements and to discern the most significant factor affecting cognitive learning. The participants in this study were predominantly female (52.34 percent), aged 10-11 years (41.72 percent), and in the 6th grade (47.68 percent).

The research results show that cognitive learning in these students is significantly affected by gender and class level. Additionally, the study reveals that factors influencing cognitive learning skills considered critical for successful 21st-century school leaders are beliefs, expectations, and personality, ranked in order of influence.

The quantitative research analysis shows that the primary factors influencing cognitive learning in primary schools in Leshan, Sichuan, China, are personality, expectations, and beliefs. Understanding these factors will be beneficial in designing educational policies and strategies that can foster cognitive learning in primary school students. This study offers valuable insights that can be instrumental in shaping teaching methodologies and learning environments in primary schools, thereby enhancing the cognitive learning outcomes for students.

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Keywords: Cognitive Learning, educational policies, and learning environment

Introduction

The COVID-19 pandemic has had a significant impact on education systems globally. In response to school closures, China launched an extensive and sudden transition to online learning, termed by UNESCO as potentially the largest simultaneous online learning exercise in history. The Chinese Ministry of Education, in collaboration with the Ministry of Industry and Information Technology, initiated a strategy called "Ensuring learning undisrupted when classes are disrupted." This initiative involved increasing internet connectivity, especially in underserved regions, enhancing bandwidth for online education platforms, mobilizing various resources for online courses, adopting flexible learning methodologies, strengthening online security, and providing psychosocial support for students (Ting et al., 2018). Artificial Intelligence was also incorporated into many online platforms, providing many online courses for students at all levels. Despite the ambitious nature of these initiatives, the sudden shift to online learning presented a range of challenges:

Lack of preparation time: Transitioning to online learning required time to adapt and prepare learning content. Simultaneously, many schools and universities had to enhance their online learning environments to facilitate the transition rapidly.

Teacher/student isolation: The abrupt switch to a purely online model, with no face-to-face interaction or blended learning, led to isolation among teachers and students. Maintaining engagement and motivation in this context was a significant challenge.

Need for practical pedagogical approaches: There was a pressing need to develop and implement pedagogical approaches that could keep students motivated and engaged over long online learning periods. This was particularly crucial given that dropout rates for distance learning tend to be higher than those for campus-based education.

The research of Huang et al. (2020) described that challenges highlight the complex considerations involved in implementing large-scale online education strategies. Future initiatives will likely need to address these issues to ensure the effectiveness and accessibility

of online learning in times of crisis. The researcher is interested in studying the effects of primary education in Chongqing, China, on students' mental health. Future education administration in Chongqing, China, will be based on the predicted and planned outcome.

Therefore, the tremendous effects of the COVID-19 pandemic are changing the way of learning, teaching, and cognition. To comply with the curriculum reform of the education system in China. The researcher is interested in studying how the teachers should understand the factors of cognitive learning from the students. To adapt themself to the new normal and for the excellence of teaching.

Research objective

1. To study the factors that affect students' cognitive learning in Primary schools in Sichuan, China.
2. To find the most critical factor that affects students' cognitive learning in Primary schools in Leshan, Sichuan, China.

Research Hypothesis

H1: The personality affected students' Cognitive learning in Leshan, Sichuan, China. Primary schools

H2: The expectations are affected by students' Cognitive learning in Leshan, Sichuan, China. Primary schools

H3: The Cognitive learning of students in Leshan, Sichuan, China, affects their beliefs. Primary schools

H4: The Cognitive learning of students in Leshan, Sichuan, China, affects the characteristics. Primary schools

Literature Review

Learning Theory

Learning involves acquiring new skills and knowledge or changing attitudes. Various theories attempt to explain this process, including behaviorism, neo-behaviorism, gestalt theory, cognitivism, and humanism. Adults have specific learning expectations and needs that should be individually addressed for optimal learning (Ajuoga, 2019). The Experience, Reflection, and Learning Model suggests that learning should be based on a student's experiences, followed by reflective processing. This model underscores the role of the teacher as a facilitator rather than just an information provider.

In teaching, clear objectives and learning outcomes need to be established before instruction. Learning encompasses three domains: psychomotor (physical skills), cognitive (thought processes), and affective (attitudes and emotions). Combining these domains can enhance effective learning (Martin-Dunlop, 2011). Modern teaching trends lean towards student-centered learning, utilizing individuals' unique learning styles and experiences to tailor instruction. This shift results from recognizing adult learners' wealth of experiences and the understanding that learning happens at individual paces. Different approaches to program design, one based on student's needs and the other based on their experiences, aim to foster practical and self-reliant learning.

The Cognitive Learning Theory originates from cognitive psychology, focusing on how individuals process and apply new information by connecting it to existing knowledge. Central to this theory are principles such as Schema Theory, Discovery Learning, and Metacognition, each playing a significant role in how knowledge is acquired, understood, and retained.

Implementing this theory in a learning environment involves encouraging active learning, promoting collaboration, emphasizing inquiry-based learning, supporting problem-based learning, and fostering constructivist learning. These strategies help to stimulate cognitive and metacognitive activities, enhancing the learners' capacity to understand and remember information effectively.

OUTCOMES OF CLASSROOM LEARNING

When pupils learn, they may learn many things. These are classified into five major categories: intellectual skills, cognitive strategy, verbal information, motor skills, and attitudes. Academic skills include the learning of concepts, rules, and problem-solving. Cognitive strategies are the skills in which the learners regulate the internal learning processes; these strategies help pupils learn. Students must learn and use effective attending, encoding, retrieving, and problem-solving strategies. Verbal information refers to information that can be expressed in words. It includes names and labels, stating propositions or facts and organizing them as connected discourse.

Motor skills refer to the ability to carry out manual work. Attitudes are the likes and dislikes that students develop towards people, things, or ideas.

Table 1: For learning to be effective, instruction has to provide these facilities.

Table 1 Learning Table

Learning Variety	Critical External Conditions
Intellectual skills concepts	Highlighting or emphasizing Prompting to encode different entities as equivalent. Providing reminders as retrieval cues for other entities in the class. Presenting examples to promote transfer Providing an opportunity to practice retrieval Providing informative feedback
Rule	Encouraging the case of mental procedure for unified encoding. Directing attention to examples of component concepts. Proving reminders to retrieve previously learned concepts

	Providing prompts for the correct sequence of concepts and their unified coding. Providing opportunities for practice
Cognitive strategies (mental procedures)	Constructing performance using the procedure and without using a procedure Demonstrating each step in the procedure Prompting unified steps in the procedure Providing opportunities to use the procedure on various tasks Providing reminders of procedure when new assignments are given Providing informative feedback
Verbal information	Teaching new mental procedures or activating learned ones Providing reminders to retrieve relevant concepts and presenting advanced organizers. Prompting to encode new information about initial concepts. Providing reminders that activate retrieved cues to enhance recovery
Attitudes	Providing incentives to interact with the objects of the attitude. Providing opportunities to engage in direct interactions. Providing feedback.
Skill	Providing models to emulate Providing practice Providing opportunities for performance Providing feedback

Cognitive Learning Theory

The utilization of technology can aid in creating an effective cognitive learning environment by providing individualized learning experiences and instant feedback. Regular assessments and constructive feedback are also integral to guide the learning process and provide necessary support. The Cognitive Learning Theory underlines the importance of learners actively engaging in their learning process and becoming independent knowledge constructors.

Cognitive learning environments are vital to stimulating learning as they are designed to foster crucial cognitive processes such as attention, memory, decision-making, and problem-solving. They offer a personalized approach to learning, allowing adaptations according to individual learning styles, making them particularly effective for learners who find traditional methods challenging. Emphasizing real-world scenarios and tasks, these environments boost engagement and motivation and aid the application of knowledge to different contexts. They also assist in developing higher-order thinking skills essential in the modern, fast-paced world (Choi et al., 2014).

Additionally, cognitive learning environments promote metacognitive skills, helping learners manage their learning processes. These skills are vital in cultivating self-directed learners, a trait necessary for higher education and the professional world. Cognitive learning environments can be created and supported through clear learning objectives, diverse and engaging instructional materials, promotion of collaboration and social learning, opportunities for practice and feedback, and tools to foster self-regulation and metacognitive skills.

Cognitive learning environments facilitate learning by offering a personalized, engaging, and comprehensive learning approach. These environments aid learners in becoming more effective and independent, equipping them with skills necessary for lifelong learning (Rachel et al., 2016).

Modern and traditional cognitive learning environments differ in various ways:

Technology: Modern environments leverage technology like computers and smartphones to aid learning and communication, while traditional environments may use it less.

Learning Styles: Modern environments offer more flexibility, catering to individual learning styles, whereas traditional ones might follow a more uniform teaching approach.

Collaboration: Modern environments promote teamwork and collaboration, while traditional ones encourage more individualistic work.

Assessment: Modern environments use diverse assessment methods, including online quizzes and projects, whereas traditional ones might lean more on traditional methods like written tests.

Flexibility: Modern environments offer more flexibility in terms of time and location, allowing students to access materials anytime, anywhere, as opposed to the more time and location-specific traditional environments.

Personalization: Modern environments use AI and machine learning to personalize learning experiences, while traditional ones may follow a more standardized approach.

Interactivity: Modern environments use interactive tools, like online simulations, to facilitate learning, unlike traditional environments that might rely more on lectures.

Accessibility: Modern environments use digital resources to make learning accessible for all students, including those with special needs. Traditional environments might struggle more with this aspect.

Cost: Modern environments may be more cost-effective, offering online access and reducing expenses related to transportation or physical resources compared to traditional ones.

Cognitive learning environments focus on mental processes involved in learning new information and promote interactive, experiential, and problem-based learning, aiming for deep understanding. Their key benefits include active learning, personalized learning, real-

world relevance, collaborative learning, flexibility, adaptive learning, self-directed learning, real-time feedback, and transfer of learning. They can be tailored to suit diverse learners' needs and promote a deep understanding and retention of knowledge.

Conceptual Framework

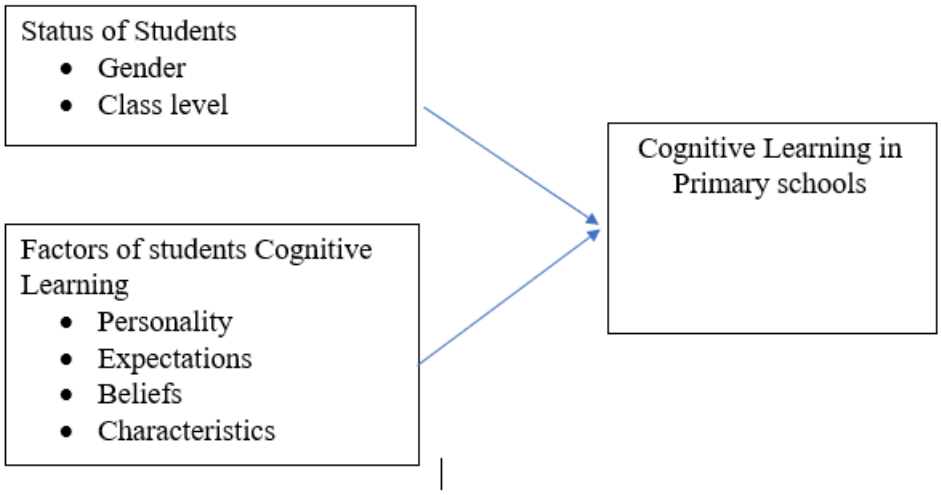

Figure 1 Conceptual Framework study of the strategies of mental health effects on students in primary school in Chongqing, China.

Research Methodology

Population and sample

The population is 186300 students in 225 primary schools in Sichuan, China. The sample group is students in primary schools in Leshan, Sichuan, China. The sample size used in this questionnaire was determined using Krejcie and Morgan's (Krejcie & Morgan, 1970) tables using purposive and simple random sampling. The sample size is 384 samples.

Research Result

Table 2 Characteristics of Respondents

Gender	Frequency	Percent
Male	183	47.65
Female	201	52.34
Total	**384**	**100.0**
Age		
Under 9 years	120	33.42
9-10 years	113	37.41
10-11 years	126	41.72
Total	**384**	**100.0**
Education		
Grade 4	86	22.39
Grade 5	129	33.59
Grade 6	150	39.06
Total	**384**	**100**

Table 3 Analysis of the predictive ability of the independent variable and dependent variable

Model	R	R Square	Adjust R Square	Std. Error of the estimate	Dublin-Watson
1	.923*	.784	.835	.2859	2.985

The Most Critical Factor affecting Students' Cognitive Learning

Table 4 Correlation Coefficient factors of Mental Health analyzed by multiple regression

Independent Variable	*b*	*S.E.*	β	*t*	*p*	Zero-order	Toleran ce	VI
Constant	.859	.249	-	3.450	.001*			
Personality	.212	.035	.200	6.110	.000**	.465	.750	1.3
Expectations	.104	.043	.076	2.431	.016*	.249	.768	1.2
Beliefs	.063	.030	.068	2.085	.038*	.281	.768	1.3

The table summarizes the results from a multiple regression analysis predicting an unspecified outcome from three independent variables: Personality, Expectations, and Beliefs. All three predictors are statistically significant, with Personality showing the most substantial impact. For each one-unit increase in Personality, Expectations, and Beliefs, the outcome increases by approximately 0.212, 0.104, and 0.063 units, respectively, all else being constant. The correlation of Personality with the outcome is the highest among the predictors. The Variance Inflation Factor (VIF) values for all predictors are close to 1, indicating that multicollinearity is not a concern in this model.

Conclusion

The respondents are students in 225 primary schools in Leshan, Sichuan, China. Most are Female 52.34 percent, age is 10-11 years 41.72 percent, and Education is Grade 6, 39.06 percent.

The significant levels of the Students of Cognitive learning in Primary schools in Leshan, Sichuan, China. are considered by the level of C.V. are Gender and Class level, respectively. The significant level of the Factors of cognitive learning of the skill for successful 21st Century school leaders that influence the teachers in a vocational school in Leshan, Sichuan, China.

are agreed and moderate, considered by the level of CV. are Beliefs, Expectations, Personality, Respectively.

Discussion

The results from the multiple regression analysis present crucial insights into the interrelationships between Personality, Expectations, and Beliefs, and the dependent variable. All three predictors exhibit statistically significant contributions to the outcome, emphasizing their unique role in determining the dependent variable. Personality is the paramount predictor (Steel et al., 2008). This implies that for each standard deviation increase in Personality, there is an expected increase of .212 standard deviations in the outcome variable while holding all other factors constant (Anglim et al., 2020). Expectations also significantly influence the outcome, albeit to a more minor degree. The outcome increases by .104 standard deviations for each standard deviation increase in Expectations (Ruggeri et al., 2022). A similar pattern is seen with Beliefs, where an increase corresponds to a modest rise in the outcome (.063 standard deviations) (Jones et al., 2018). The zero-order correlations delineate the relationships between each independent variable and the outcome. The strongest association exists between Personality and the outcome (.465), accentuating the significance of Personality as a predictor (Steel et al., 2008). In evaluating the risk of multicollinearity through Tolerance and Variance Inflation Factor (VIF) values, it was found that there were no issues of multicollinearity in this study (O'brien, 2007). All VIF values were near 1, and Tolerance statistics were well above the frequently used cut-off of .10, confirming that multicollinearity was not a problem in this analysis (Peterson, 2018).

To summarize, the outcomes of the multiple regression analysis indicate that Personality, Expectations, and Beliefs significantly predict the outcome. Building on these findings, future research could delve into the specific mechanisms through which these variables influence the outcome and explore potential interactions among these variables.

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