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The Impact of Psychological Capital on the Creative Capacity of Students in Project-Based Learning Courses at Universities in Vietnam

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Abstract:

Creativity and innovation capacity is a key factor in promoting sustainable development across all aspects, and for universities, this becomes even more significant. This study aims to examine the impact relationships of psychological capital on students' creative capacity in project-based learning modules at universities in Vietnam. Using a quantitative research method through exploratory factor analysis (EFA) and structural equation modeling (SEM), the study involves a sample of 468 students who are currently studying at universities in Vietnam and have either directly engaged with or previously experienced project-based learning environments. The results of the study provide valuable contributions both scientifically and practically. Although psychological capital was found to have no direct effect on students' creative capacity, it was found to have an indirect impact through two mediating factors: satisfaction level and environmental adaptability. Additionally, both satisfaction and adaptability were shown to have a positive effect on students' learning motivation. Based on the research findings, the authors propose several recommendations to enhance psychological capital, thereby improving students' creative capacity in project-based learning courses at universities in Vietnam.

Keywords: Psychological Capital; Satisfaction Level; Learning Motivation; Environmental adaptability; Creative Capacity.

1. Introduction

Universities play a pioneering role in fulfilling their mission to promote innovative startups by providing society with a workforce equipped with the necessary thinking and skills, as well as research outcomes to be applied in practice. In the digital age, human resources are at the center of all activities, and innovation plays a crucial role in enhancing productivity, fostering sustainable development for organizations, and serving as an essential foundation for creating competitive capacity. According to the Law on Science and Technology of Vietnam, innovation refers to the creation and application of achievements, technical solutions, technologies, and management solutions to improve the effectiveness of socio-economic development, enhance productivity, quality, and the added value of products and goods. Innovation can be simply understood as the process of renewing, creating, or changing methods that lead to high efficiency in the development of science and technology, thinking, and management approaches. Research by Luthans et al. (2015) affirms the important role of knowledge content in developing innovative capacity. Gontareva et al. (2022) emphasize that the most important condition for developing an innovation ecosystem in universities is the concentration of highly competent and qualified researchers (including lecturers and students) who either have already

demonstrated the ability to generate new ideas or have the potential to do so. Furthermore, these researchers should have the ability to succeed in commercializing their innovations.

Individuals with high self-confidence, the ability to adapt to change easily, and resilience when facing difficulties are more likely to achieve success in their work and new tasks (human capital development skills) and foster social relationships (Luthans et al., 2007). Such individuals are also more likely to achieve specific goals through self-directed determination, energy, and awareness of internal control (Luthans et al., 2015). The innovative capacity of students not only reflects their ability to acquire knowledge but also includes the development of important skills, competencies, and attitudes. In the field of education, innovation is considered an integral part of the pedagogical process, not only related to improving students' learning but also influencing parents, teachers, and education administrators. Recent studies have shown an increasing interest in the role of psychology and positive emotions in the learning process, which inspire students' creativity. Research by You and Kang (2014) found that positive emotions enhance students' motivation and encourage the use of learning strategies. Psychological capital, as a core structure in the field of education, supports and enables students to achieve future learning goals (Gervey & Kowal, 2005).

Project-based learning is a teaching model in which students collaborate to solve a learning problem based on the knowledge they have learned and with the support of the teacher. From the problems they solve, students can create products that can be presented or published. In reality, the project-based teaching model has been widely adopted and implemented by many universities in Vietnam. This teaching method emphasizes both theoretical knowledge acquisition and practical application through hands-on experience, helping to foster the development of students' thinking and cognition, allowing them to accumulate more knowledge derived from real-life situations. As a result, students who engage in this type of learning activity significantly improve their critical thinking, creativity, and practical skills. However, at many higher education institutions in Vietnam, the implementation of project-based learning is often superficial, with a greater emphasis on display than on fostering students' proactive abilities through hands-on practice and real-life experiences. Although the curriculum has been improved, it still tends to be theoretical and lacks high applicability.

This study aims to examine the impact of psychological capital on students' creative capacity in project-based learning modules at universities in Vietnam. Using a quantitative research method with exploratory factor analysis (EFA) and structural equation modeling (SEM), the findings make significant contributions both scientifically and practically by demonstrating the mediating roles of satisfaction and adaptability in the impact relationships of psychological capital on students' creative capacity. Furthermore, satisfaction and adaptability were found to positively influence students' learning motivation. Based on the research findings, the authors propose several recommendations to enhance psychological capital, thereby fostering students' creative capacity in project-based learning modules at universities in Vietnam.

2. Literature review and hypotheses

2.1. Literature review

Psychological capital is the essence of human beings, representing a positive psychological state in an individual's personal development (Avey et al., 2009). It surpasses both human capital and social capital (Luthans et al., 2007). Psychological capital relates to "who you are now" and, in a developmental sense, "who you can become" in the future (Luthans & Youssef, 2004; Luthans et al., 2007; Avolio & Luthans, 2008).

According to Luthans et al. (2015), psychological capital is a positive psychological development state, characterized by: (i) having the confidence to take on challenging tasks and achieve success with the required effort; (ii) making positive attributions (optimism) about current and future success; (iii) resiliently pursuing goals and, when necessary, changing paths to achieve them (hope); and (iv) enduring, resisting, and overcoming problems and adversity (resilience) to achieve success.

According to Kotler and Armstrong (2012), satisfaction is a person's sense of contentment when comparing their perception of a product or service with their expectations. Student satisfaction is often viewed as a short-term attitude, resulting from the evaluation of the student's educational experience (Elliot & Healy, 2001). Weerasinghe et al. (2017) reviewed the available literature on student satisfaction in higher education and found little change in the definition of this concept. Zhao (2003) defined satisfaction as the students' contentment with the quality of the curriculum, instructors, administrative staff, and services. Student satisfaction, which reflects students' positive perceptions of their learning experience, is an important indicator of outcomes related to both the program and students (Liao & Hsieh, 2011). High student satisfaction can lead to lower dropout rates, higher persistence, and greater commitment to the program (Reinhart & Schneider, 2001; Yukselturk & Yildirim, 2008; Ali & Ahmad, 2011).

Many researchers have emphasized that motivation plays an important role in human activity. Motivation is an internal process that helps drive, direct, and sustain continuous action (Murphy & Alexander, 2000; Schunk, 2000; Stipek, 2002; Pintrich, 2003). Learning motivation is defined as the willingness to explore the material presented in a development program (Noe, 1986). Learning motivation explains what individuals can do and influences the direction and level of effort in learning activities (Kappagoda et al., 2014). Furthermore, the psychological orientations of college students are crucial in evaluating their situations, which can affect their happiness, health, and attitudes towards academic achievement (Tomaka & Blascovich, 1994). Learning motivation is one of the most critical components in the learning process (Slavin, 2008).

According to Kelley (2013), students' innovative capacity includes creative thinking, adaptability, and creativity in practical learning. Innovation is the use of new knowledge to create a new service or product that customers desire; innovation involves both the invention process and commercialization (Afuah, 2012). Similarly, Fagerberg (2004) stated that innovation is the initial commercialization of an idea. Therefore, innovation has become a core competency that is universally integrated into daily practices (Bozic, 2017). Weiner (2001) defined competence as skills and expertise either available or

developed through training to address defined situations, along with the readiness for social motivation and the ability to apply them flexibly in those situations.

2.2. Research hypothesis

2.2.1. Psychological Capital and Students' Creative Capacity

Psychological capital is the essence of human beings and represents a positive psychological state in an individual's development (Avey et al., 2009). Psychological capital positively influences human nature and helps individuals achieve high performance in their work (Luthans & Youssef, 2004). The study by Stukalenko et al. (2016) highlighted support from colleagues and supervisors, including showing concern for students' emotions and issues, as well as providing contributions and feedback that have a positive impact on students' creative capacity. Individuals with high psychological capital are often more proactive in making decisions to cope with specific situations, demonstrating quick thinking and innovation in response to environmental changes.

In the context of universities in Vietnam, this study examines the impact of psychological capital on students' creative capacity. The hypothesis proposed is:

H1: Psychological capital positively affects students' creative capacity in project-based learning modules at universities in Vietnam.

2.2.2. Psychological Capital and Student Satisfaction

The creative capacity of students is formed and developed through their inherent qualities and the learning process, responding to the demands of technological change and advancements in science and technology. Numerous studies have shown that psychological capital (PsyCap) has a positive and statistically significant relationship with student satisfaction (Avey et al., 2009). According to Weiner (2001), service quality and learning quality significantly impact student satisfaction. Psychological capital plays a crucial role in shaping attitudes, thinking, and positive perceptions, thereby fostering student satisfaction in the learning environment. Therefore, the following hypothesis is proposed:

H2: Psychological capital positively influences the level of student satisfaction with project-based learning modules at universities in Vietnam.

2.2.3. Student Satisfaction and Creative Capacity

Optimism enables individuals to attract favorable conditions and avoid negative experiences, which boosts their self-esteem and morale. This, in turn, enhances their confidence, creativity, and work effectiveness (Luthans & Youssef, 2004). Kappagoda et al. (2014) studied employee satisfaction and organizational commitment as key measures of desired attitudes, finding a strong relationship between these factors and work performance. In the educational context, improving student satisfaction is a key goal to enhance the quality of education and training and to promote creativity and innovation within universities.

In the context of universities in Vietnam, the impact of student satisfaction on their creative capacity has become an important area of study. Based on this, the following hypothesis is proposed:

H3: The level of student satisfaction positively influences their creative capacity in project-based learning modules at universities in Vietnam.

2.2.4. Psychological Capital and Student Motivation

Luthans et al. (2007) found that an individual's motivation to successfully complete a specific task within a defined context is influenced by their psychological capital and emotional regulation skills during the execution of those tasks. You and Kang (2014) suggest that positive emotions have a significant impact on enhancing student motivation. Therefore, based on this understanding, the following hypothesis is proposed:

H4: Psychological capital positively influences student motivation in project-based learning modules at universities in Vietnam.

2.2.5. Student Motivation and Creative Capacity

Intrinsic motivation refers to the drive fueled by passion, enjoyment, and the desire to engage in tasks that involve thinking, analysis, and creatively solving problems (Amabile, 1996). According to Eder and Sawyer (2008), autonomy in creativity allows individuals to feel confident in facing risks and striving to find new ways to complete tasks. Psychological capital nurtures student motivation (Datu & Valdez, 2016). When students have strong learning motivation, it creates a positive mindset that enhances their cognitive and creative abilities in the learning and research environment.

Therefore, the following hypothesis is proposed:

H5: Student motivation positively influences their creative capacity in project-based learning modules at universities in Vietnam.

2.2.6. Psychological Capital and Student Adaptability

High psychological capital leads to increased confidence, faster achievement of goals, and a positive state for the organization (Zhao, 2003). Psychological capital is positively associated with students' learning engagement (You & Kang, 2014), happiness (Datu & Valdez, 2016). Liao and Hsieh (2011) found that psychological capital in the form of self-efficacy, hope, and optimism has a significant positive correlation with learning engagement, adaptability to the learning environment, and student outcomes.

Thus, the following hypothesis is proposed in the study regarding how psychological capital impacts students' adaptability to the learning environment in project-based learning modules at universities in Vietnam:

H6: Psychological capital positively influences students' to the environmental adaptability in project-based learning modules at universities in Vietnam.

2.2.7. Environmental adaptability and Student Creativity

A positive learning environment plays a crucial role in fostering the development of creativity and innovation skills. Such an environment provides students with resources, modern technology, creative workspaces, and encourages discussions, free thinking, and the exploration of new ideas, all of which enhance their innovative abilities (Ovbiagbonhia et al., 2019). According to Richards (2018), learners

themselves play a central role in developing and improving their creative capacity. Personal traits such as self-confidence, adaptability, curiosity, communication skills, and social interaction significantly influence students' creative abilities.

In the context of universities in Vietnam, the relationship between Environmental adaptability and student creativity leads to the following hypothesis:

H7: Environmental adaptability positively influences students' creativity in project-based learning modules at universities in Vietnam.

2.2.8. Satisfaction and Student Motivation

Ryan and Deci (2000) assert that external motivation can become internal motivation through the process of integration, which is enhanced when the environment or social context satisfies three basic psychological needs. Intrinsic motivation acts as an important mediator between psychological capital and student engagement (Schunk, 2000). Students with higher satisfaction levels are more likely to improve their academic performance through enhanced motivation. Therefore, the following hypothesis is proposed:

H8: Satisfaction positively influences student motivation in project-based learning modules at universities in Vietnam.

2.2.9. Environmental Adaptability and Student Motivation

Student motivation is defined as the desire, enthusiasm, responsibility, and energy invested in learning (Bomia et al., 1997). In the digital age, adaptability to new contexts has become increasingly essential not only for lecturers, scientists and administrators but also students. High adaptability to the environment enhances students' motivation, which in turn boosts their thinking and creativity in learning and research. In the context of universities in Vietnam, the study proposes the hypothesis:

H9: Environmental adaptability positively influences student motivation in project-based learning modules at universities in Vietnam.

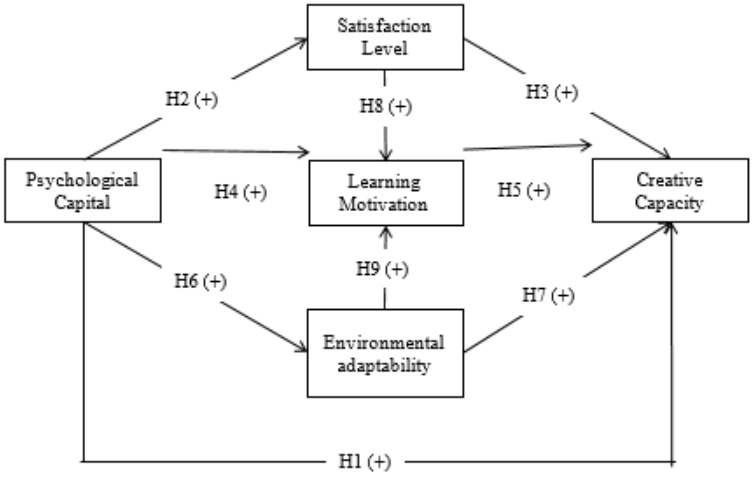

Figure 1. Proposed research model

3. Research methodology

3.1. Research scale

Based on the theoretical overview and related studies, the research proceeds to analyze, select, and construct a model that includes 5 variables. The independent variable is psychological capital; the mediating variables include satisfaction level, learning motivation, and environmental adaptability; and the dependent variable is creative capacity. The indicators used to measure these variables are derived from scales in previous studies, with adjustments made to ensure relevance to the context of students at universities in Vietnam. The measurement scale used in this study is the Likert scale with 5 levels, corresponding to scores from 1 to 5 (1: Strongly Disagree; 2: Disagree; 3: Neutral; 4: Agree; 5: Strongly Agree).

Table 1. Origin of the scale of variables

No.	*Variable*	*Code*	*Number of observations*	*Origin of the scale*
1	Psychological capital	PSY	7	Luthans et al (2015)
2	Satisfaction level	SAT	6	Gervey and Kowal (2005)
3	Learning motivation	MOT	5	Stee & Porter (1983)
4	Environmental adaptability	ADA	5	Luthans et al (2015)
5	Creative capacity	CRE	6	Avey et al. (2009)

3.2. Research samples

The study uses a non-probability sampling method with a certain quota division. This method ensures that a specified number of sample units from different categories of the research population, with specific characteristics, are included in the sample. The survey targets students who are currently studying at universities in Vietnam and have either directly engaged with or previously experienced project-based learning courses. The selected universities are distributed proportionally and cover all three regions of Vietnam: North, Central, and South.

The sample size for data collection is 468, with data collected through both direct distribution of paper questionnaires and online surveys via Google Forms. In the direct distribution method, 400 questionnaires were issued, 282 were returned, and 251 were valid. For the online survey, 224 responses were collected, and 217 were valid. The total number of valid responses used for analysis is 468. According to Hair et al. (2010), the recommended sample size should be at least five times the number of observed variables. With 29 observed variables in this study, the sample size of 468 is sufficient for analysis.

The data collection period spans from January 2024 to September 2024.

3.3. Data processing

The study uses a quantitative research method. After data collection, the data are aggregated, analyzed, and processed using SPSS and AMOS version 22.0 software.

First, the study assesses the reliability of the measurement scales, with the requirement that the Cronbach’s Alpha coefficient should be greater than 0.7 and the corrected item-total correlation should

be greater than 0.3. If the Cronbach's Alpha value "If Item Deleted" is greater than the Cronbach's Alpha of a variable, the corresponding item should be considered for removal.

Next, the study conducts an exploratory factor analysis (EFA) to evaluate the convergent validity and discriminant validity of the measurement scales for the variables and indicators. The requirements for EFA analysis include a factor loading greater than 0.5, a Kaiser-Meyer-Olkin (KMO) value between 0.5 and 1, a Sig. value less than 0.05, and the percentage of variance explained greater than 50%. The factor extraction method used is the Varimax rotation method.

Following that, AMOS software is used to assess the goodness-of-fit of the model with the research data through confirmatory factor analysis (CFA). Finally, the study tests the research hypotheses using structural equation modeling (SEM). The required model fit indices are: chi-square/df < 3 (Hair et al., 2010), P < 0.05, GFI, TLI, CFI > 0.9 (Segars & Grover, 1993), and RMSEA < 0.08 (Taylor et al., 1993).

4. Research results and discussion

4.1. Testing the reliability of the scale

The results of the Cronbach's Alpha test show that the reliability of the measurement scales and the values of the data used in the analysis are satisfactory. Specifically, the Cronbach's Alpha coefficient for all variables is greater than 0.7, and the item-total correlations for all variables are greater than 0.3. Furthermore, the Cronbach's Alpha "If Item Deleted" values are all smaller than the total Cronbach's Alpha for each variable. This indicates a strong correlation between the observations (indicators) within the same factor, confirming the internal consistency and reliability of the measurement scales used in the study.

Table 2. Rating the reliability of the scale through Cronbach's Alpha coefficient

No.	*Variable*	*Code*	*Cronbach's Alpha*
1	Psychological Capital	PSY	0.864
2	Satisfaction Level	SAT	0.898
3	Learning Motivation	MOT	0.850
4	Environmental Adaptability	ADA	0.900
5	Creative Ability	CRE	0.939

These Cronbach's Alpha values all exceed the threshold of 0.7, indicating that the measurement scales for all variables are highly reliable.

4.2. Explore factor analysis (EFA)

After assessing the reliability of the measurement scales through the Cronbach's Alpha test, the study proceeded to perform exploratory factor analysis (EFA) to examine the convergent and discriminant validity of the scales for the variables and indicators. EFA was carried out sequentially for the independent, mediating, and dependent variable groups.

For the independent and mediating variable groups, the EFA analysis was conducted twice. In the first analysis, the convergent validity requirements were not met, so the indicator PSY4 was removed. The results of the second analysis showed that the data met the research requirements, with factor loadings

greater than 0.5; the Kaiser-Meyer-Olkin (KMO) value was 0.917 (within the acceptable range of 0.5 to 1); the P-value was 0.000 (< 0.05); the percentage of variance explained was 66.824% (> 50%). These results satisfied the two conditions of "Convergent Validity" (observed variables converging on the same factor) and "Discriminant Validity" (observed variables belonging to one factor are distinct from other factors).

For the dependent variable, creative ability (CRE), EFA was conducted only once, and the results showed that the data met the research requirements.

Table 3. EFA factor analysis results

EFA analysis		*KMO coefficient*	*P-value*	*Variance extracted*	*Factor loading*	*Conclusion*
Independent and mediating variables	First round	0.915	0.000	64.658	All coefficient > 0.5	Exclude indicator PSY4
	Second round	0.917	0.000	66.824	All coefficient > 0.5	Meet requirements
Dependent variable		0.894	0.000	78.735	All coefficient > 0.5	Meet requirements

4.3. Confirmatory factor analysis (CFA)

To assess the overall fit of the data and the model, the study performed confirmatory factor analysis (CFA). CFA is the next step following EFA and is used to validate the unidimensionality, multidimensionality, convergent validity, and discriminant validity of the measurement scales used in the study.

The results of the CFA analysis demonstrated that the measurement model is suitable for the data. The indicators for the analysis are as follows: Chi-square = 855.881; df = 340; P = 0.000 (less than 0.05); Chi-square/df = 2.517 (less than 3); GFI = 0.880 (greater than 0.8); TLI = 0.938 (greater than 0.8); CFI = 0.945 (greater than 0.8); RMSEA = 0.057 (less than 0.08)

4.4. SEM Linear Structure Model Analysis

To test the hypotheses, the study conducted a Structural Equation Modeling (SEM) analysis. The results of the analysis showed that the overall fit indices met the required criteria. Specifically, Chi-square = 880.039; df = 341; P = 0.000 (<0.005); Chi-square/df = 2.581 (< 3); GFI = 0.877 (> 0.8); TLI = 0.936 (> 0.8); CFI = 0.942 (> 0.8); RMSEA = 0.058 (< 0.08).

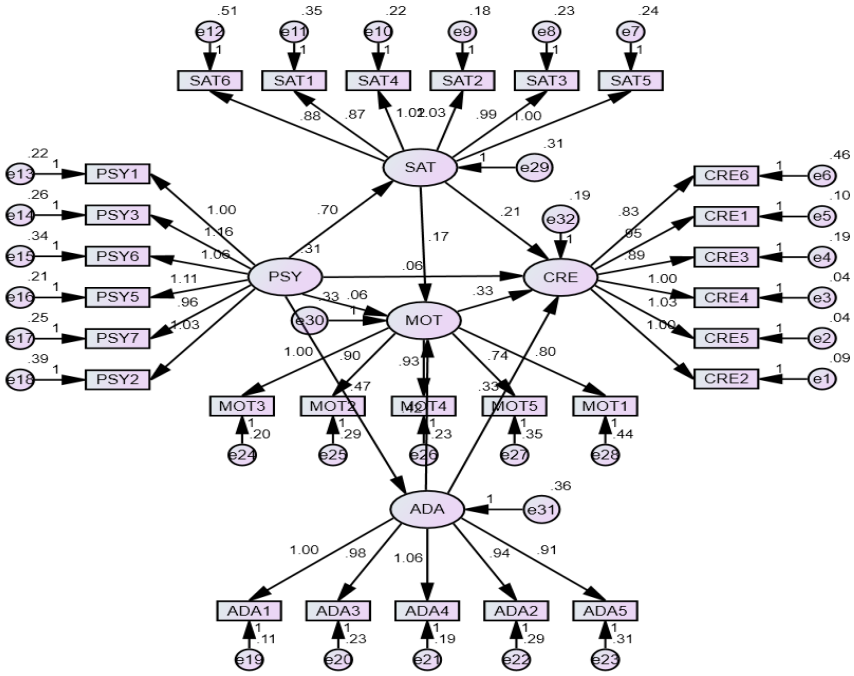

Figure 2. SEM model analysis

The results of the estimation of relationships in the research model show that the proposed model fits well, except for two hypotheses, H1 and H4, which were rejected due to their significance levels being greater than 0.05 in the hypothesis testing.

Specifically, H1 was rejected because the significance level was 0.264 (> 0.05), indicating that psychological capital does not have a direct impact on students' creative capacity in project-based learning courses at universities in Vietnam.

Hypotheses H2 and H3 were accepted, with significance levels in the hypothesis testing < 0.05 and regression weights greater than 0. This indicates that psychological capital has a positive impact on satisfaction level, and satisfaction level also has a positive impact on students' creative capacity in project-based learning courses at universities in Vietnam. In other words, the study has demonstrated that satisfaction level plays a mediating role in the impact relationship of psychological capital on students' creative capacity. These findings are consistent with the results of previous research by Weiner (2001); Luthans and Youssef (2004); Avey et al. (2009); Kappagoda et al. (2014).

For hypotheses H4 and H5, the research results indicated that while H5 was accepted because it met both requirements—significance level in testing P<0.05P < 0.05P<0.05 and a positive regression weight—H4 was rejected due to the significance level in the test being P=0.466P = 0.466P=0.466 (greater than 0.05). This suggests that learning motivation has a positive impact on students' creative capacity, but psychological capital was found to have no direct impact on students' learning motivation in project-based learning courses at universities in Vietnam.

Hypotheses H6 and H7 were accepted, with significance levels in the hypothesis testing < 0.05 and positive regression weights. This indicates that psychological capital has a positive impact on students' adaptability to the learning and research environment, and adaptability to the environment also has a

positive impact on students' creative abilities in project-based learning courses at universities in Vietnam.

In other words, the study has demonstrated that environmental adaptability plays a mediating role in the impact relationship of psychological capital on students' creative capacity. These findings align with the results of previous research by Zhao (2003); Liao and Hsieh (2011); You and Kang (2014); Datu and Valdez (2016); Richards (2018); Ovbiagbonhia et al. (2019).

In addition, with significance levels in the hypothesis testing all < 0.05 and positive regression weights, hypotheses H8 and H9 were also accepted. From this, it can be concluded that both satisfaction level and environmental adaptability have a positive impact on students' learning motivation in project-based learning courses at universities in Vietnam. These findings align with the results of previous research by Bomia et al. (1997); Ryan and Deci (2000); Schunk (2000).

Table 4. Results of SEM analysis for relationships in the model

Hypothesis	*Relationship*	*Weightage*	*S.E.*	*C.R.*	*P*	*Conclusion*
H1	CRE <--- PSY	0.063	0.056	1.116	0.264	Rejected
H2	SAT <--- PSY	0.700	0.064	10.889	0.000	Accepted
H3	CRE <--- SAT	0.214	0.044	4.869	0.000	Accepted
H4	MOT <--- PSY	0.057	0.078	0.730	0.466	Rejected
H5	CRE <--- MOT	0.332	0.043	7.654	0.000	Accepted
H6	ADA <--- PSY	0.467	0.060	7.790	0.000	Accepted
H7	CRE <--- ADA	0.327	0.044	7.474	0.000	Accepted
H8	MOT <--- SAT	0.174	0.059	2.957	0.003	Accepted
H9	MOT <--- ADA	0.421	0.055	7.691	0.000	Accepted

Thus, by rejecting two hypotheses, H1 and H4, while accepting all the other hypotheses, the study has demonstrated the validity of the proposed research model and made valuable contributions both scientifically and practically. In terms of scientific value, the study first proves the mediating role of two factors- satisfaction level and environmental adaptability- in the impact relationship of psychological capital on students' creative capacity. Second, the research also confirms that satisfaction level and environmental adaptability have a positive impact on students' learning motivation. In terms of practical value, the research findings may change the perspectives of administrators and educators regarding the importance of enhancing students' psychological capital. This, in turn, can help improve student satisfaction and adaptability, fostering creativity throughout their learning process- not only in project-based learning courses but across all academic subjects in the university environment.

4.5. Descriptive Statistical Analysis

In addition to the valuable research findings, to provide an overview of the actual situation regarding the factors used in the model, the study conducted a descriptive statistical analysis of the research data. The results revealed that students' motivation for learning and research in universities in Vietnam was rated the highest among the five factors in the research model, with an average evaluation score of 3.8662.

This is a very positive signal, indicating the effectiveness of university management and the attention given to students by the institutions, as well as the recognition from students themselves. This finding provides a foundation for universities to confidently implement effective management solutions, enhance innovation and creativity, and foster sustainable development in teaching and research activities.

On the contrary, students' satisfaction was rated the lowest, with an average score of 3.4754 on a 5-point scale. Student satisfaction is a goal that all universities strive for; however, this relatively low score indicates that many aspects of student management at universities are not yet effectively implemented. There are still numerous shortcomings that negatively affect students' psychological well-being, which can hinder the development of their critical thinking and creativity. This is an area that universities in Vietnam must pay close attention to, identifying the root causes and addressing these issues in the near future to improve the overall student experience and foster a more conducive learning environment.

Table 5. The results of statistical analysis describe the value of the variables

Variable	*N*	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
PSY	468	1.33	5.00	3.7568	0.62629
SAT	468	1.17	5.00	3.4754	0.69175
MOT	468	1.20	5.00	3.8662	0.64118
ADA	468	1.00	5.00	3.6269	0.67418
CRE	468	1.00	5.00	3.8202	0.64027
Valid N (listwise)	468				

5. Conclusions and recommendations

5.1. Conclusions

Creativity and innovation capacity is a key factor in promoting sustainable development across all aspects, and it becomes even more significant in the context of universities. This study aims to examine the impact of psychological capital on students' creativity in project-based learning courses at universities in Vietnam. The research findings reveal that although psychological capital does not directly influence students' creativity, it has an indirect effect through two factors: satisfaction and environmental adaptability. Moreover, both satisfaction and environmental adaptability were found to positively influence students' learning motivation. These results provide valuable contributions both scientifically and practically. They offer insights for university administrators, policymakers, and educators to develop practical solutions to enhance students' creative abilities and improve the effectiveness of university management and operations.

5.2. Recommendations

Based on the research findings, the authors propose several recommendations to enhance psychological capital, thereby fostering students' creative abilities in project-based learning courses at universities in Vietnam:

Enhancing Psychological Capital: Universities should increase support in providing necessary resources to help students gain sufficient financial, material, and mental resources. This could include organizing and providing research grants to fund student innovation projects and creative activities.

Student Satisfaction: Universities need to maintain and promote activities that apply students' innovative capacities through the development of thinking by adopting a constructivist learning model. They should create learning environments that place students' autonomy and self-management at the center, encouraging interaction, collaboration, and the search for knowledge through hands-on experience.

Learning Motivation: Universities should gradually shift from traditional teaching methods to modern, student-centered approaches that encourage active participation. This could include using games, internet-based teaching methods, or virtual reality software to stimulate students' creative thinking. These approaches will allow both instructors and students to track the learning process and provide opportunities for self-assessment and feedback, enabling the sharing of ideas and experiences.

Environmental Adaptability: This factor requires significant improvement, especially for most students. Universities should strengthen extracurricular activities and enhance programs that connect students with organizations and businesses. Such initiatives will help students improve their practical skills, adapt more effectively, and be better prepared for the challenges of the future job market.

5.3. Limitations and future research

In addition to the valuable contributions, the study also highlights certain limitations. Firstly, the non-probability sampling method with stratified quota sampling was used in the research. While this method helps to easily access and collect more data, ensuring that a certain number of sample units from different categories of the study population with specific characteristics are included in the sample, its downside is that the representativeness of the sample is not high, which may affect the overall results of the study. Secondly, the chosen context is limited to students studying project-based courses at universities in Vietnam. Therefore, the results may differ when applied to regular courses or when the scope is extended to universities in other countries, especially large universities around the world today. Based on these limitations, the study suggests the following directions for future research: (1) Expanding the scope of application to all courses, all types of universities, both public and private, and universities from other countries in the region and around the world; (2) Testing the relationships between psychological capital and students' creativity with other mediating and moderating variables in comparison to the chosen research model, thereby providing further conclusions regarding the relationships between these two factors.

References

[1] Afuah, A. (2012). *Managing the process of change and innovation*, National Economics University Publishing House, Ha Noi, Vietnam.

[2] Ali, A., & Ahmad, I. (2011). Environment Friendly Products: Factors that Influence the Green Purchase Intentions of Pakistani Consumers. *Pakistan Journal of Engineering Technology & Science*, 2(1), 84-117.

[3] Amabile, T. M. (1996). *Creativity and Innovation in Organizations*, Harvard Business School, United States.

[4] Avey, J. B., Luthans, F., & Jensen, S. M. (2009). Psychological capital: A positive resource for combating employee stress and turnover. *Human resource management, 48*(5), 677-693.

[5] Avolio, B. J., & Luthans, F. (2008). *The High Impact Leader,* McGraw-Hill Education.
[6] Bomia, L., Beluzo, L., Demeester, D., Elander, K., Johnson, M., & Sheldon, B. (1997). *The Impact of Teaching Strategies on Intrinsic Motivation* (pp. 1-28), Opinion Papers.
[7] Bozic, N. (2017). Integrated model of innovative competence. *Journal of Creativity and Business Innovation*, 3, 140-169.
[8] Datu, J. A. D., & Valdez, J. P. M. (2016). Psychological Capital Predicts Academic Engagement and Well-Being in Filipino High School Students. *The Asia-Pacific Education Researcher*, 25, 399-405.
[9] Eder, P. J., & Sawyer, J. (2008). *The power of to be creative at work: Examining the componential model of Employee creativity,* Paper presented at the Eastern Academy of Management Anual Conference in Washington, D.c.
[10] Elliot, K. M., & Healy, M. A. (2001). Key factors influencing student satisfaction related to recruitment and retention. *Journal of Marketing for Higher Education*, 10, 1-11.
[11] Fagerberg, J. (2004). *Innovation: A guide to the literature*, Georgia Institute of Technology.
[12] Gervey, R., & Kowal, H. (2005). The Job Developer's Presence in the Job Interview: Is It Helpful or Harmful to Persons with Psychiatric Disabilities Seeking Employment?. *Psychiatric Rehabilitation Journal*, 29(2), 128–131.
[13] Gontareva, I., Kurt, M. M., Dorokhov, O., Grinik, R. R., & Galayko, N. (2022). A Systematic-Functional Approach in Managing Innovative Development of Construction Enterprises in Ukraine. *TEM Journal*, 11(1), 125-137.
[14] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis,* 7th Edition, Pearson, New York.
[15] Kappagoda, S., Othman, H., Fithri, Z., & De Alwis, W. (2014). The impact of psychological capital on job performance in the banking sector in Sri Lanka. *International Journal of Arts and Commerce*, 3(5), 198-208.
[16] Kotler, P., & Armstrong (2012), *G. Principles of Marketing*, 14th Edition, Global Edition, Pearson Prentice Hall.
[17] Liao, P. W., & Hsieh, J. Y. (2011), *What Influences Internet-Based Learning?,* Soc. Behav. Pers. Int. J. 39, 887-89.
[18] Luthans, F., & Youssef, C. M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. *Organizational Dynamics*, 33(2), 143–160.
[19] Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. *Personnel psychology,* 60(3), 541-572.
[20] Luthans, F., Youssef, C. M., & Avolio, B. J. (2015). *Psychological capital and beyond,* Oxford University Press, USA.
[21] Murphy, P. K., & Alexander, P. A. (2000). A motivated look at motivational terminology. [Special Issue]. *Contemporary Educational Psychology*, 25, 3-53.
[22] Noe, R. A. (1986). Trainees' Attributes and Attitudes: Neglected Influences on Training Effectiveness. *Academy of Management Review*, 11, 736-749.
[23] Ovbiagbonhia, A. R., Kolloffel, B., & Brok, P. D. (2019). Educating for innovation: students' perceptions of the learning environment and of their own innovation competence. *Learning Environments Research*, 22(1), 387–407.
[24] Pintrich, P. R. (2003). A Motivational Science Perspective on the Role of Student Motivation in Learning and Teaching Contexts. *Journal of Educational Psychology*, 95(4), 667–686.
[25] Reinhart, J., & Schneider, P. (2001). Student Satisfaction, Self-Efficacy, and the Perception of the Two-Way Audio/Video Distance Learning Environment: A Preliminary Examination. *Quarterly Review of Distance Education*, 2(4), 357.
[26] Richards, G. J (2018). *Promoting Creativity and Innovation in College Students,* Innovate- Lead- Succeed, Volume: ISBN no:978-81-910125-4-5 on page nos 115-119, Chapter 14.
[27] Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78.
[28] Schunk, D. H. (2000). *Learning theories: An educational perspective (3rd ed.),* Upper Saddle River, NJ: Prentice-Hall.
[29] Segars, A., & Grover, V. (1993). Re-Examining Perceived Ease of Use and Usefulness: A Confirmatory Factor Analysis. *MIS Quarterly*, 17, 517-525.
[30] Slavin, R. E. (2008). Cooperative Learning, Success for All, and Evidence-based Reform in education. *Education et didactique,* 2(2), 51-159.
[31] Steers, R. M., & Porter, L. W. (1983). *Motivation and Work Behavior,* McGraw-Hill, New York.
[32] Stipek, D. J. (2002). *Motivation to Learn: Integrating Theory and Practice,* Boston, MA: Allyn & Bacon.

[33] Stukalenko, N. M., Zhakhina, B. B., Kukubaeva, A. K., Smagulov, N. K., & Kazhibaeva, G. K. (2016). Studying innovation technologies in modern education. *International journal of environmental and science education*, 11(15), 7297-7308.

[34] Taylor, S., Sharland, A., Cronin, J., & Bullard, W. (1993). Recreational Service Quality in the International Setting. *International Journal of Service Industry Management*, 4, 68-86.

[35] Tomaka, J., & Blascovich, J. (1994). Effects of justice beliefs on cognitive appraisal of and subjective physiological, and behavioral responses to potential stress. *Journal of Personality and Social Psychology*, 67(4), 732–740.

[36] Weerasinghe, S., Lalitha, R., & Fernando, S. (2017). Students' Satisfaction in Higher EducationLiterature Review. *American Journal of Educational Research*, 5(5), 533-539.

[37] Weiner, B. (2001). Intrapersonal and interpersonal theories of motivation from an attributional perspective. *Educational Psychology Review*, 12, 1-14.

[38] You, J. W., & Kang, M. (2014). The role of academic emotions in the relationship between perceived academic control and self-regulated learning in online learning. *Computers & Education*, 77, 125–133

[39] Yukselturk, E., & Yildirim, Z. (2008). Investigation of Interaction, Online Support, Course Structure and Flexibility as the Contributing Factors to Students' Satisfaction in an Online Certificate Program. *Journal of Educational Technology & Society*, 11, 51-65.

[40] Zhao, F. (2003), *Postgraduate Research Supervision: A Process of Knowledge Management*, Quality in Higher Education, 9, 187-197.