Predictors of Experimental Self-Efficacy Using Quality of Learning Experience and Student Engagement

Melecio Jocma Apolinares Jr, Dr. Gina Fe G. Israel

University of Mindanao

DOI: https://dx.doi.org/10.47772/IJRISS.2025.903SEDU0317

Received: 19 June 2025; Accepted: 28 June 2025; Published: 09 July 2025

ABSTRACT

Aims: This study aimed to determine the influence of quality learning experience and student engagement on students' experimental self-efficacy. It sought to identify the stronger predictor between the two.

Study design: Descriptive-correlational and predictive research design.

Place and Duration of Study: Selected public Senior High Schools in the Division of Bukidnon, Philippines, during the School Year 2024-2025.

Methodology: The study involved 317 Senior High School students selected through Slovin's formula using stratified sampling. Data were collected using adapted survey instruments that measured quality learning experience (15 items), student engagement (12 items), and experimental self-efficacy (12 items). Descriptive statistics, Pearson r, and multiple regression analysis were employed.

Results: This study investigated the influence of student engagement and quality of learning experiences on students' experimental self-efficacy, using Bandura's Social Cognitive Theory as its guiding framework. A descriptive-correlational design was employed, and data were gathered using validated survey instruments measuring engagement, learning experiences, and experimental self-efficacy. Findings revealed that both student engagement and learning experiences were rated high by students. However, results from multiple regression analysis showed that student engagement was the strongest significant predictor of experimental self-efficacy ($B = 0.961$, $\beta = 0.740$, $t = 7.978$, $p < .001$), while learning experience was not statistically significant ($B = -0.144$, $\beta = -0.120$, $t = -1.294$, $p = .198$). The model explained 44% of the variance in experimental self-efficacy ($R^2 = 0.440$), with cognitive and emotional engagement showing the strongest associations.

Conclusion: Student engagement—particularly cognitive and emotional dimensions—is a stronger predictor of experimental self-efficacy than learning experience. Emphasis on active, engaging strategies is crucial in science instruction.

Keywords: Student Engagement, Learning Experience, Experimental Self-Efficacy, Science Education, Laboratory Instruction

INTRODUCTION

The study addresses the critical issue of low experimental self-efficacy among Filipino senior high school students, as evidenced by the Philippines' poor performance in science-related international assessments such as PISA 2018 (OECD, 2023). Only 19% of Filipino students met the baseline science proficiency, indicating struggles with applying scientific knowledge in practical contexts. This lack of proficiency reflects students' limited confidence and ability in laboratory-based tasks—core components of experimental self-efficacy (Virtic, 2022). Low levels of self-efficacy often result in reduced participation, increased anxiety, and poor readiness to tackle scientific problems (Fortus et al., 2022).

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume IX Issue IIIS June 2025 | Special Issue on Education

Developing experimental self-efficacy is key to enhancing STEM education. Students with high self-efficacy are more likely to persist, think critically, and effectively handle experimental challenges (Murray et al., 2019). In the Philippine context, strengthening this self-belief is vital not only for improving classroom performance but also for preparing a STEM-capable workforce (Boulton et al., 2019). Therefore, this study focuses on the influence of learning experiences and student engagement—both seen as possible drivers of self-efficacy.

Learning experiences, when positive and structured, are known to enhance students' academic confidence (Altenberga & Rubene, 2022). Simultaneously, student engagement, including behavioral, emotional, and cognitive participation, contributes significantly to knowledge retention and motivation (Firmansiya et al., 2023). However, limited research explores how both variables collectively influence experimental self-efficacy in the Philippines, where schools face challenges like overcrowded classrooms and limited laboratory access (Frianeza et al., 2024).

This study aims to address these gaps by identifying which factor—learning experience or student engagement—better predicts experimental self-efficacy among Filipino students. It also explores descriptive metrics such as engagement levels, quality of learning environments, and confidence in conducting experiments, with key constructs drawn from established theories.

The research is grounded in several theoretical frameworks. Kearsley and Schneiderman's (1999) Engagement Theory emphasizes student participation in collaborative, project-based learning tasks. Constructivist theory, as proposed by Vygotsky, highlights the importance of social interaction and the Zone of Proximal Development (Young & Collin, 2004), making it relevant for examining learning experiences. Bandura's (1986) Social Cognitive Theory, as reviewed by Abdullah (2021), remains central—asserting that self-efficacy is shaped by mastery experiences, social modeling, and emotional arousal. These views are reinforced by DiFrancesca (2020), who emphasizes that students build confidence in carrying out experimental activities when they are actively involved in the learning process and engage meaningfully with their environment.

The study holds practical value for various stakeholders. It aims to inform educators and policymakers on where to focus their efforts—whether on enhancing learning environments or deepening student engagement—to improve experimental outcomes. It also offers a methodological and theoretical foundation for future researchers interested in student-centered approaches to science education. Ultimately, the goal is to empower students with the skills, confidence, and mindset necessary to thrive in experimental science and STEM fields.

MATERIAL AND METHODS

Study Design and Participants: A descriptive-correlational design was used. 317 students from Grades 11 and 12 across Kitaotao I, Quezon II, and Quezon III districts in Bukidnon were sampled using Slovin's formula and stratified sampling.

Instruments: Three adapted survey instruments were checked by a series of experts and were tested by an expert for reliability tests using Cronbach's alpha.

Experimental self-efficacy (Chit-kwong, 2006) (12 items; 4 dimensions: conceptual understanding, procedural complexity, laboratory hazards, and sufficient resources) with a reliability result of 0.824 interpreted as good.

Quality of learning experience (Delfino, 2019) (15 items; positive experience, teacher support, active learning) with reliability result of 0.913 interpreted as excellent.

Student engagement (Vysakh et. al., 2020) (12 items; behavioral, cognitive, emotional engagement) with a reliability result of 0.889 interpreted as good.

Data Collection and Analysis: Validated questionnaires were administered with ethical approval. Data were analyzed using mean, Pearson r, and multiple regression (predictors analysis) to determine the strongest predictor.

RESULTS AND DISCUSSION

Level of Learning Experiences of Students

Using a survey questionnaire with indicators such as positive learning experiences, teacher support, and active learning, the study aimed to determine students' level of experimental self-efficacy. Table 1 shows a high overall mean score of 3.81 (SD = 0.51), with **teacher support** emerging as the highest-rated factor (M = 4.02), followed by positive learning experiences (M = 3.78), and active learning (M = 3.63). These results suggest that students strongly recognize the supportive role of teachers in enhancing their academic experience, while also indicating room for improvement in implementing more dynamic, student-centered strategies. The findings align with Sato & Ocdenaria (2025), who emphasized the importance of autonomy, competence, and relatedness in developing self-efficacy in science. Similarly, Wilczewski et al. (2024) found that supportive classroom environments significantly boost students' confidence in performing science-related tasks.

Level of Engagement of Students

Student engagement is a key factor in academic success and was assessed in this study across behavioral, cognitive, and emotional dimensions. Table 2 reports an overall high engagement level (M = 3.68, SD = 0.47), with behavioral engagement rated highest (M = 3.78), suggesting students are attentive, participative, and committed in class. Cognitive engagement, while still high (M = 3.60), indicates a need for more intellectually stimulating tasks to deepen students' critical thinking. These findings align with Baquiano (2023), who confirmed that behavioral, cognitive, and emotional engagement are all strongly linked to academic performance among Filipino students. Furthermore, this high engagement supports the development of experimental self-efficacy, as engaged learners tend to be more confident and persistent in tackling inquiry-based tasks. Lobo (2024) also supports this, noting that engagement provides a motivational foundation for learning and fosters key outcomes such as self-efficacy, resilience, and achievement.

Level of Experimental Self-Efficacy of Students

To evaluate students' readiness for laboratory work, the study assessed their experimental self-efficacy across four indicators: conceptual understanding, laboratory hazards, procedural complexity, and sufficient resources. The results in Table 3 indicate an overall high level of self-efficacy (M = 3.46, SD = 0.61), with conceptual understanding rated highest (M = 3.66), suggesting strong theoretical confidence. However, sufficient resources received the lowest rating (M = 3.36), reflecting only moderate confidence—pointing to concerns about equipment availability and procedural execution. These findings align with Borah and Nisanth (2024), who asserted that self-efficacy is shaped by mastery experiences, task difficulty, and access to resources. The results also support Chiang et al. (2022) and Bandura's theory that mastery and supportive environments build confidence. While students appear confident conceptually, gaps in procedural skills and resource sufficiency must be addressed to fully develop their experimental self-efficacy.

Significance of the Relationship between Learning Experiences and Experimental Self-efficacy of Students

Understanding the link between students' learning experiences and their confidence in conducting scientific tasks is essential for improving laboratory performance. Table 4 shows a significant positive relationship between positive learning experiences and experimental self-efficacy ($r = .425$, $p < .001$), with the strongest association seen in Procedural Complexity ($r = .431$). This suggests that students who perceive their learning as meaningful are more confident in handling complex experiments.

Active learning experiences also showed strong correlations with overall self-efficacy ($r = .418$), especially in Conceptual Understanding ($r = .408$) and Sufficient Resources ($r = .361$), emphasizing the importance of participatory and hands-on learning in boosting students' confidence. Interestingly, Teacher Support in Learning—while rated highly in other parts of the study—did not significantly correlate with self-efficacy ($r = .123$, $p = .169$), indicating that support alone may not build confidence unless coupled with active student involvement.

These findings align with Bandura's Social Cognitive Theory, which highlights mastery experiences as the most powerful source of self-efficacy (Fredricks & Benjamin, 2023). Similarly, Fabia (2024) found that Filipino students who engaged in experiential learning reported higher confidence, especially in managing complex tasks. Overall, this study underscores the importance of designing learning environments that promote both positive and active engagement to strengthen students' experimental self-efficacy.

Significance of the Relationship between Engagement and Experimental Self-efficacy of Students

Student engagement plays a crucial role in shaping students' confidence and success in science-related tasks. As shown in Table 5, there is a strong, significant positive relationship between all types of engagement—behavioral, emotional, and cognitive—and experimental self-efficacy ($r = .658$, $p < .001$). This suggests that students who are more actively and emotionally involved in their learning tend to exhibit greater confidence in performing experimental activities.

These findings align with Gonzales (2021), who identified emotional and cognitive engagement as key predictors of self-efficacy among Filipino learners. In a resource-limited educational setting like the Philippines, where large class sizes and lack of laboratory access are common, fostering engagement becomes especially important. Aksela et al. (2024), through the lens of self-regulated learning, emphasized that emotional and cognitive self-management are critical in building academic confidence. Encouraging student engagement through emotionally supportive and intellectually stimulating environments can thus serve as a high-impact approach to strengthening experimental self-efficacy. This underscores the need for learner-centered strategies that promote curiosity, persistence, and ownership of learning in science education.

Significance of the Influence of Learning Experiences and Engagement on Experimental Self-efficacy

To better understand the combined impact of learning experiences and student engagement on experimental self-efficacy, a linear regression analysis was conducted. Table 6 presents the results, highlighting how these two factors contribute to students' confidence in performing scientific experiments. The model yielded an R-value of .664, indicating a strong positive relationship between the predictors (Learning Experiences and Engagement) and Experimental Self-efficacy. The R^2 value of .440 means that the combined influence of learning experiences and engagement can explain 44% of the variance in experimental self-efficacy.

To fully understand the complete individual predictors, engagement emerged as a significant predictor ($B = 0.961$, $\beta = 0.740$, $t = 7.978$, $p = .000$) of Experimental Self-efficacy. This result indicates that student engagement substantially contributes to developing confidence in performing experimental tasks. In contrast, learning experiences did not significantly predict experimental self-efficacy ($B = -0.144$, $\beta = -0.120$, $t = -1.294$, $p = .198$), suggesting that, while positive learning environments are important, they do not independently predict self-efficacy when engagement is accounted for. The significant F-value ($F = 48.406$, $p = .000$) confirms that the overall model is statistically significant.

The study's findings reveal that between the two variables analyzed—learning experiences and student engagement—it is student engagement that significantly predicts experimental self-efficacy. This insight emphasizes that students build confidence in handling experimental tasks primarily through active, emotional, and cognitive involvement in learning rather than from learning environment quality alone.

This aligns with the DepEd's MATATAG curriculum reforms and Sulong EduKalidad, which advocate for learner-centered, inquiry-based, and inclusive approaches in science education. Strategies like project-based learning, collaborative experimentation, and real-world problem-solving are essential to developing confident, experiment-ready students.

Supporting this, Fredricks and Benjamin (2023) identified engagement—particularly its behavioral, emotional, and cognitive aspects—as a more direct predictor of academic success than structural support. Although students in this study rated their learning experiences positively, it was engagement that had the most significant influence on their experimental self-efficacy.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume IX Issue IIIS June 2025 | Special Issue on Education

The findings of this study, which highlight student engagement, particularly its cognitive and emotional dimensions, as a strong predictor of experimental self-efficacy, are supported by Wijetunga (2024), who examined engagement in online learning environments during the COVID-19 pandemic in Sri Lanka. The study revealed that students with higher levels of engagement demonstrated greater academic resilience, motivation, and learning performance, even in challenging virtual settings. This underscores the critical role of engagement in maintaining learning effectiveness, particularly in science education, where active participation, curiosity, and emotional investment are essential for developing confidence in experimental tasks.

This finding is further supported by Borah and Nisanth (2024) and grounded in Bandura's theory, which highlights mastery experiences and self-directed engagement as essential to building self-efficacy. Engaged students are more likely to persist through challenges, apply critical thinking, and develop confidence through success. Thus, to enhance experimental self-efficacy, schools must not only maintain supportive learning environments but prioritize deep, meaningful student engagement in science education.

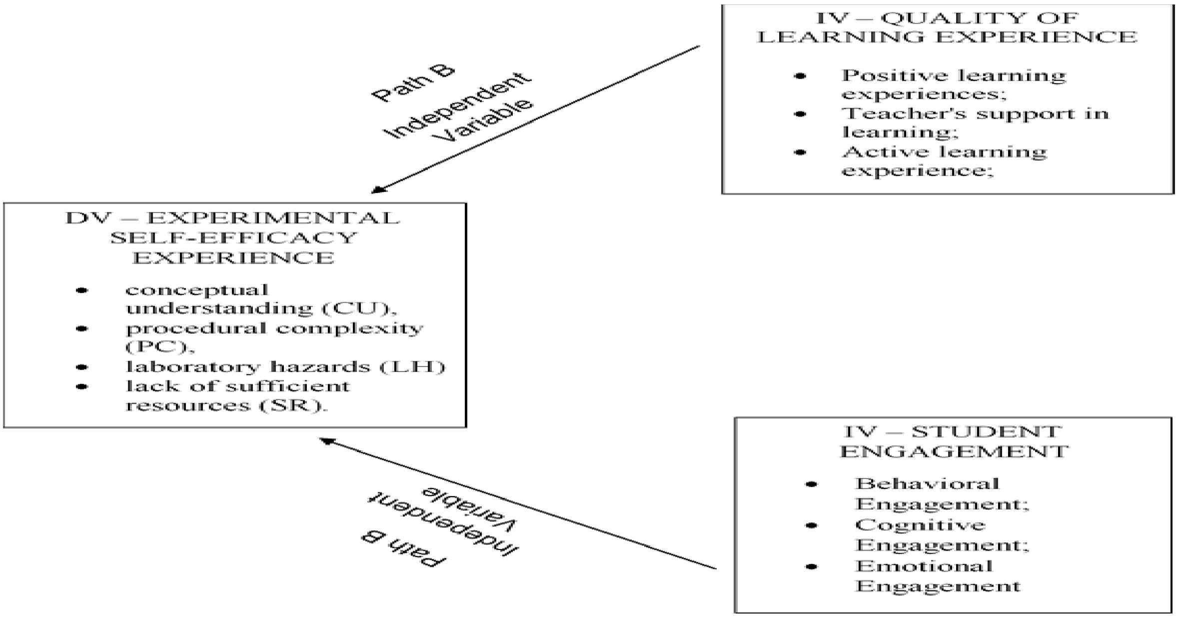

Figure 1. Conceptual Framework

Table 1. Level of Learning Experiences of Students

Indicators	SD	Mean	Descriptive Level
Positive Learning Experiences	0.63	3.78	High
Teacher Support in Learning	0.65	4.02	High
Active Learning Experiences	0.60	3.63	High
Overall	**0.51**	**3.81**	**High**

Table 2. Level of Engagement of Students

Indicators	SD	Mean	Descriptive Level
Behavioral Engagement	0.53	3.78	High
Cognitive Engagement	0.52	3.60	High
Emotional Engagement	0.55	3.66	High
Overall	**0.47**	**3.68**	**High**

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume IX Issue IIIS June 2025 | Special Issue on Education

Table 3. Level of Experimental Self-efficacy of Students

Indicators	SD	Mean	Descriptive Level
Conceptual Understanding	0.65	3.66	High
Laboratory Hazards	0.81	3.44	High
Procedural Complexity	0.65	3.38	Moderate
Sufficient Resources	0.74	3.36	Moderate
Overall	**0.61**	**3.46**	**High**

Table 4. Significance of the Relationship between Learning Experiences and Experimental Self-efficacy of Students

Learning Experiences	Experimental Self-efficacy				
	Conceptual Understanding	Laboratory Hazards	Procedural Complexity	Sufficient Resources	**Overall**
Positive Learning Experiences	.357** .000	.331** .000	.431** .000	.359** .000	**.425** .000**
Teacher Support in Learning	.140 .118	.055 .538	.108 .228	.132 .140	**.123 .169**
Active Learning Experiences	.408** .000	.350** .000	.326** .000	.361** .000	**.418** .000**
Overall	**.363** .000**	**.295** .001**	**.349** .000**	**.343** .000**	**.388** .000**

* p<0.05, ** p<0.01, ***p<0.001

Table 5. Significance of the Relationship between Engagement and Experimental Self-efficacy of Students

Engagement	Experimental Self-efficacy				
	Conceptual Understanding	Laboratory Hazards	Procedural Complexity	Sufficient Resources	**Overall**
Behavioral Engagement	.414** .000	.355** .000	.411** .000	.409** .000	**.458** .000**
Cognitive Engagement	.586** .000	.462** .000	.522** .000	.560** .000	**.613** .000**
Emotional Engagement	.562** .000	.469** .000	.648** .000	.665** .000	**.675** .000**
Overall	**.587** .000**	**.484** .000**	**.597** .000**	**.616** .000**	**.658** .000**

* p<0.05, ** p<0.01, ***p<0.001

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume IX Issue IIIS June 2025 | Special Issue on Education

Table 6. Significance of the Influence of Learning Experiences and Engagement on Experimental Self-efficacy

Experimental Self-efficacy					
(Variables)		*B*	β	*t*	*Sig.*
Constant		.474		1.371	.173
Learning Experiences		-.144	-.120	-1.294	.198
Engagement		.961	.740	7.978	.000
R	.664				
R^2	.440				
ΔR	.431				
F	48.406				
ρ	.000				

* $p<0.05$, ** $p<0.01$, ***$p<0.001$

CONCLUSION

This study concludes that student engagement plays a pivotal role in shaping experimental self-efficacy, surpassing the influence of quality learning experiences alone. Among the dimensions of engagement, cognitive and emotional aspects emerged as the most influential predictors of students' confidence in conducting scientific investigations. These findings emphasize the need for science educators to design classroom environments and instructional strategies that actively involve students intellectually and emotionally. By fostering deeper engagement, schools can empower learners to take ownership of their experimental learning and build stronger self-efficacy in science practices. These results highlight the need for science educators to create classroom environments and instructional approaches that intellectually challenge students and connect with them on an emotional level. When students are deeply engaged, they are more likely to take ownership of their learning and develop stronger self-efficacy in experimental science.

The research was limited due to it is confined to public senior high schools within a single Division/Region in the Philippines, which may limit the generalizability of findings to other educational settings. Additionally, the study relied on self-reported data, which may be subject to biases such as social desirability or limited self-awareness among students. Future research may explore the longitudinal impact of engagement on experimental self-efficacy, assess how these variables interact across different grade levels or STEM disciplines or integrate qualitative methods to gain deeper insights into student perceptions. This can be in bigger settings and further investigation into how resource constraints, cultural context, and teacher practices influence these relationships would also enrich the understanding and application of engagement-driven science education.

Consent (Where Ever Applicable)

All authors declare that written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal."

Ethical Approval (Where Ever Applicable)

All authors hereby declare that this study was approved by the University of Mindanao Ethics Review Committee under protocol no. UMERC-2025-070. All authors hereby declare that "Principles of laboratory animal care" (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws where applicable. All experiments have been examined and approved by the appropriate ethics committee.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

REFERENCES

1. Virtič, M. (2022). Teaching science & technology: components of scientific literacy and insight into the steps of research. International Journal of Science Education, 44, 1916 - 1931. https://doi.org/10.1080/09500693.2022.2105414.
2. Fortus, D., Lin, J., Neumann, K., & Sadler, T. (2022). The role of affect in science literacy for all. International Journal of Science Education, 44, 535 - 555. https://doi.org/10.1080/09500693.2022.2036384.
3. Boulton, C., Hughes, E., Kent, C., Smith, J., & Williams, H. (2019). Student engagement and well-being over time at a higher education institution. PLoS ONE, 14. https://doi.org/10.1371/journal.pone.0225770.
4. Altenberga, J., & Rubene, Z. (2022). How to Learn Science Literacy? Overview of the Most Topical and Researched Learning Approaches. Human, Technologies, and Quality of Education, 2022. https://doi.org/10.22364/htqe.2022.35
5. Firmansyah, R., Habib, I., & Prihandini, D. (2023). Application of popular scientific books to improve students' scientific literacy. International Social Sciences and Humanities. https://doi.org/10.32528/issh.v2i2.262.
6. Frianeza, E., Maravilla, H., Relox, R., Dagaraga, S., Cruz, C., Solomon, E., & Mohammad, N. (2024). Challenges in the Philippine educational system and its impact towards teachers' instruction strategies and professional growth. Journal of Pedagogy and Education Science. https://doi.org/10.56741/jpes.v3i01.414.
7. Kearsley, G. & Shneiderman, 1999. Engagement Theory: A framework for technology-based teaching and learning. Royal Roads University. http://dx.doi.org.jerome.stjohns.edu:81/10.1186/s 41239-020-00199-x.
8. Young, R., & Collin, A. (2004). Introduction: Constructivism and social constructionism in the career field. Journal of Vocational Behavior, 64, 373-388. https://doi.org/10.1016/J.JVB.2003.12.005.
9. Adullah, S. (2021). Social Cognitive Theory: A Bandura Thought Review published in 1982-2012. PSIKODIMENSIA. https://doi.org/10.24167/PSIDIM.V18I1.1708.
10. DiFrancesca, H. (2020). Interactive, Team-Based Learning Environment Enhances Students Learning and Confidence. The FASEB Journal, 34. https://doi.org/10.1096/fasebj.2020.34.s1.06671.Chit-kwong, K. (2006). Classroom learning experiences and student’s perception of
11. quality of school life. Journal Articles; Reports - Research Springer. 233 Spring Street, New York, NY 10013. https://eric.ed.gov/?id=EJ811469
12. Dr. Armando P. Delfino. (2019). Student Engagement and Academic Performance of
13. Students of Partido State University. Faculty of Education, Partido State University, Philippines – May 2019, volume 21 Issue 3.
14. Vysakh, K. K., Muthupalani, S., & Achuthan, K. (2020). Virtual experimental platforms in chemistry laboratory education and its impact on experimental self-efficacy. International Journal of Educational Technology in Higher Education (2020) 17:30 https://doi.org/10.1186/s41239-020-00204-3

15. Sato, J. & Ocdenaria, JM. 2025. Mediating effect of students self-efficacy on the relationship between academic hardiness and students' learning engagement in science. EPRA International Journal of Multidisciplinary Research (IJMR). Philippines. https://doi.org/10.36713/epra20536
16. Wilczewski, M., Gorbaniuk, O., Mughan, T., Giuri, P., & Li, M. (2024). The development and cross-cultural validation of a Student Online Learning Experience Scale. *Journal of Further and Higher Education*, 48, 481 - 495. https://doi.org/10.1080/0309877X.2024.2347536
17. Baquiano, M. J. 2023. Understanding research engagement among academics in the Philippines using the theory of planned behavior. Volume 13. Issue 1. International Perspectives in Psychology. Philippines. https://doi.org/10.1027/2157-3891/a000087 Lobo, J. (2024). Perceived instructor's emotional support and its mediating effect to students' academic resilience and study engagement: In the case of a higher education institution in the Philippines. Interpersona: An International Journal on Personal Relationships. https://doi.org/10.5964/ijpr.10549.
18. Borah, P., & Dr. Nisanth, P. (2024). Self-efficacy of the secondary students in regard to their type of school and gender. International Journal of Multidisciplinary Research in Arts, Science and Technology. India. https://doi.org/10.61778/ijmrast.v2i5.58.
19. Chiang, F., Zhang, Y., Zhu, D., Shang, X., & Jiang, Z. (2022). The influence of online stem education camps on students' self-efficacy, computational thinking, and task value. *Journal of Science Education and Technology*, 31, 461 - 472. https://doi.org/10.1007/s10956-022-09967-y.
20. Fredricks, E. & Benjamin, A. (2023). Studying the students' perceptions of engagement and problem-solving skills for academic achievement in chemistry at the higher secondary level. Educ. Inf. Technol., 29, 8347-8368. https://doi.org/10.1007/s10639-023-12165-x.
21. Wijetunga, C. S. (2024). Student Engagement in the Online Learning Environment during the COVID-19 Pandemic in Sri Lanka. Asian Journal of Agricultural Extension, Economics & Sociology, 42(8), 69–86. https://doi.org/10.9734/ajaees/2024/v42i82533
22. Fabia, J. (2024). Students' satisfaction, self-efficacy and achievement in an emergency online learning course. Research in Learning Technology. https://doi.org/10.25304/rlt.v32.3179.
23. Gonzalez, A. 2021. Senior high school students' self-efficacy and its relation to engagement in online class setting in a private university in the south of Metro Manila. Vol 32 No 4 (2021): Science Education International. Philippines.https://www.icaseonline.net/journal/index.php/sei/article/view/347?
24. Aksela, O., Lämsä, J., & Järvelä, S. (2024). Secondary School Students' Enacted Self-Regulated Learning Strategies in a Computer-Based Writing Task–Insights from Digital Trace Data and Interviews. *Technology, Knowledge, and Learning*. https://doi.org/10.1007/s10758-024-09789-4.