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EMBRACING THE COMPLEXITY AND INNOVATION MODEL IN THE CLASSROOM SETTING TOWARD STUDENT ACADEMIC PERFORMANCE

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Abstract:
The study aims to embrace complexity and innovation in classroom settings toward student academic performance. Specifically, it aims to answer complexity and innovation models in a classroom setting toward student academic performance of the respondents, fostering active participation and engagement, promoting problem-solving and critical thinking, enhancing learning outcomes, leveraging technology, and addressing complexity. Mixed methods are employed in the research design for both quantitative and qualitative approaches as a result of concurrent Focus Group Discussion (FGD). A convenient sampling method is utilized in the selection of the population sample size. The study comprised fifty (50) respondents only. Results show that embracing complexity and innovation model in classroom setting toward student academic performance incorporates various instructional teaching strategies in different activities such as group works, individual works, discussion, lecture, and engages various learning styles, show that fostering active participation and engagement innovates method in teaching for interactive learning to assist students' active participation process, show that promoting problem solving and critical thinking develop student critical thinking by embracing complexity and innovation in diverse learning experiences and inclusivity in the real world process of the educational system, show that enhancing learning outcome personalizes and innovates approach to cater diverse learning style and inquiry-based learning, show that leveraging technology involves various digital platforms and tools in enhancing learning and teaching to improve communication skills, personalized learning experiences, enhance, learning engagement, foster collaboration, and facilitate

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discussion, and show that addressing complexity embraces understanding learning environment such as evolving demands in the community, diverse needs of students which is crucial in creating efficient inclusive and diverse learning experiences.

Keywords: embracing complexity and innovation model, classroom setting, and student academic performance

1. Introduction

Embracing complexity and innovation in a classroom setting enhances and recognizes teaching and learning toward the academic performance of students as centers of learning. It requires a dynamic process, creativity, and adaptability. It adopts traditional approaches in teaching methods, moving beyond the involvement process to foster collaboration, critical thinking, and explore willingness for new knowledge and ideas (Mallillin, 2024). It includes allowing students to take the challenge, self-reflection, encouragement, and learning in a flexible environment that can be learned through experiences. It highlights important results of embracing innovation and complexity in the classroom environment and setting (Mallillin, 2023, pp. 7686-7700). It views change in the context of globalization. It suggests and adapts systems to management and understands the need to embrace complexity and innovation in the classroom setting for the academic achievement of students (Hussein & Barakat, 2025). It involves proper knowledge and approach to foster complexity in teaching and learning as a guide to change, innovate, and frame the academic performance of students as centers of learning. It focuses on diversity and teacher preparation for multicultural learning and concepts (Mallillin *et al.,* 2024). It adapts to a diverse environment and the needs of teachers in the educational system. It embraces and adapts classroom complexity and innovation in a flexible approach for students as centers of learning. It includes strategies and diverse recognition needs to foster a growth mindset in the learning opportunity and a challenged development innovation model in the academic performance of students (Mallillin *et al.* 2021). This includes various instructions utilization tailored to different learning abilities and styles in teaching and learning. It encourages collaborative learning, reflective practice implementation, embracing technology, innovation, responsive environment, developing resilience, and leadership (Isabirye *et al.* 2025, pp. 334-348).

On the other hand, the principles of embracing complexity and innovation in the classroom setting toward academic performance align with the approach theory to help educators thrive in the dynamic classroom interconnected environment of learning. It promotes innovation, key methods and strategies in the classroom setting to foster the mindset and growth of the learners (Mallillin, 2020, pp. 1-11). It views challenges to encourage both lecturers and students for learning and development opportunity experiments in teaching based on the needs of students as centers of learning. It provides psychological safety in supporting and creating a learning environment for students to be comfortable in the achievement of academic performance. It utilizes resources and

digital tools in creating teaching facilitation approaches to embrace technology (Oberer, & Erkollar, 2024, pp. 1-17). It also promotes interdisciplinary teamwork and promotes collaborative learning and thinking from various perspectives. It customizes adaptability in allowing for meeting student interests and needs in a diverse, flexible curriculum design. It reflects the practice of cultivating feedback and reflection to refine innovation ideas and feedback in teaching and learning (Mallillin, 2024, pp. 120-132). It supports teachers in their professional development, in their ongoing innovation and training of pedagogy trends in the educational system. It helps in the innovation of a clear vision and change for a strong leadership practice. It evolves in meeting the ever-changing demands of embracing complexity and innovation in the classroom setting. It is concept-based in accordance with the needs of students as centers of learning (Novawan, *et al.*, 2024, pp. 125-145).

Moreover, globalization influences the embrace of the complexity and innovation model of the classroom setting through cultural diversity and an increase in curriculum shape and content. It adopts and encourages the practice of teaching innovation toward the academic performance of students as centers of learning. It promotes global perspective and exposure to understand and foster multiculturalism in meeting diverse needs of students through adaptive teaching methods and strategies toward academic performance of the learners (Mallillin, 2022). It pushes globally the education system to integrate collaboration and technology in preparing students' career and the future interconnection process. It enriches the challenges and dynamics of traditional classroom settings. It encourages educators to enhance complexity and innovation to embrace fully the academic performance of students (Hassan, 2025). It undergoes a profound transformation in the educational institution to address the challenges in the globalization crisis of the school setting. It presents and defines a comprehensive framework in the educational system based on the curriculum and needs of students as centers of learning through goals, mission, and values. It sustains and ensures relevant effectiveness in the global challenges in addressing the complexity of embracing innovation in the classroom setting toward student academic performance (Mallillin, 2025, pp. 152-166). It examines the role and multifaceted aspects in fostering global needs in the educational system, such as innovation, inclusivity, and diversity. It adapts global influences in evolving dynamics and volatility of the educational setting. It emphasizes a framework that aligns with the emerging challenges of the educational system around the globe. It serves to bring about a positive change in the global educational system (Sari *et al.* 2024, pp. 23-39).

Furthermore, the benefits of embracing complexity and innovation in a classroom setting toward academic performance improve student engagement and the learning process. It leads to a deeper understanding of inquiry-based activities and the hands-on learning process for a profound concept and grasping the teaching. It fosters creativity and encourages innovation and exploration in teaching and learning. It embraces change, complexity, and innovation to develop the skills of students to thrive in the learning process (Mallillin & Lopez, 2024, pp. 97-108). It increases collaboration to build

communication skills, teamwork, and learning activities. It improves the innovation process in the classroom setting practices. It engages motivation to provide relevant learning excitement in assisting students to enjoy their studies. It encompasses various instructional methods to increase student engagement and motivation in learning through the innovation process (Tiwari & Fahrudin, 2024). It deepens understanding, collaboration, and develops creativity through real exposure for teaching and learning. It represents a pedagogical landscape evolution of the classroom setting through embracing complexity and innovation models among students. It enhances potential accessibility, personalized learning, and engagement of the learners. It emphasizes benefits, innovation, challenges, and current trends of learning and in embracing the complexity of students in their academic performance (Mallillin, 2023). It addresses the technical challenges in embracing the complexity and innovation of equitable access to educational technology. It illustrates potential teaching and learning to improve outcomes in the educational setting. It anticipates the role and benefits of the innovation model and complexity in the classroom setting toward student academic performance. It adopts best practices in the focus of professional development benefits to leverage learning (Venugopal & Vinoth, 2024).

2. Statement of the problem

1) What is the extent of embracing complexity and innovation in the classroom setting toward student academic performance?
2) How may innovation models embrace complexity in the classroom setting toward student academic performance?

3. Research design

Mixed methods are employed in the study. It is the result of a concurrent focus group discussion (FGD) that resulted in both quantitative and qualitative processes of research design. Quantitative process is observed in the measure of embracing complexity and innovation model in classroom setting toward student academic performance of the respondents as to fostering active participation and engagement, promoting problem solving and critical thinking, enhancing learning outcome, leveraging technology, and addressing complexity. On the other hand, a qualitative process is observed in analyzing and evaluating the innovation model that embraces complexity in the classroom setting toward student academic performance. It offers guidelines and a synopsis of the study application. It summarizes the quality of mixed methods and pivotal information on common practices. It designs specific recommendations in embracing the complexity and innovation model of the classroom setting in developing the enhanced academic performance of students. It involves a combination of quantitative and qualitative research design based on the set criteria of the study (Taheri & Okumus, 2024, pp. 995-1004).

3.1 Sampling techniques

Convenience sampling is employed in the process of selecting the population and sample size of the study. It is a non-probability sampling technique or method in the selection of respondents based on availability and access. It is cost-effective, easy, and quick in the collection of data needed in the process of research. It is suitable for the sampling techniques for embracing complexity and innovation models in the classroom setting toward students' academic performance. It is a non-probability in nature that relies on the selection ability of the participants. It dominates the impact of convenience sampling methods in research and the selection sample size of the study. It is based on the theory and model of the composite relationship of the mixed methods process. It provides the necessary process for the sources of the sampling techniques, such as driven respondent networks, professional panels, and sources. It highlights the ability of the sample sources in a generalized data set (Winton & Sabol, 2022, pp. 861-876).

3.2 Participants of the study

The subjects of the study are the professional lecturers for both public and private Higher Education Institutions (HEIs) sectors. Particularly in the National Capital Region (NCR). They are being topped as participants based on the criteria set by the researcher. The participants must be teaching in the Higher Education Institutions for more than a year. They have been exposed to embracing complexity and innovation in the classroom setting toward student academic performance. The study comprised fifty (50) respondents only.

3.3 Data gathering and procedure

The study is focused on embracing complexity and innovation models in the classroom setting toward student academic performance. The data gathering and procedures are discussed below.

3.3.1 Mapping

The researcher did the mapping on the possible topic to be utilized in the conduct of the study. The trends of the educational system and needs are considered in the mapping. The researcher read various articles related to possible topics. This is where the topic is being constructed.

3.3.2 Construction of the topic

After the mapping is done, the researcher drafted the topic and sought assistance from the expert in conducting research for possible feedback and recommendations. The topic constructed is "Embracing complexity and innovation model in classroom setting toward student academic performance". This is one of the trends now, where it needs to provide solutions and recommendations in the educational system.

3.3.3 Research questions

After the construction of the topic, the variables of the study are being considered to analyze and evaluate the process of the study in providing concrete recommendations and solutions under investigation. The proposed questions are as follows: What is the embracing complexity and innovation model in the classroom setting toward student academic performance of the respondents as to fostering active participation and engagement, promoting problem solving and critical thinking, enhancing learning outcomes, leveraging technology, and addressing complexity. This includes how many innovation models embrace complexity in the classroom setting toward student academic performance.

3.3.4 Validation of research tools

After the formulation of the research questionnaire tools, they are being validated by an expert in mixed methods. They are professional doctorate degrees and psychometricians. All their suggestions and recommendations are being considered prior to the floating of questionnaires.

3.3.5 Floating questionnaire

The floating of questionnaires is done through a Google form as a trend in advanced technology. It is paperless. Included in the Google form is the waiver and voluntary participation in the research process. It is taken with utmost confidentiality, where the participation is for gathering data in the research process.

3.3.6 Analysis of data

The result of the data is being analyzed through statistical treatment for a concrete conclusion and recommendation of the study.

4. Result

4.1 What is embracing complexity and innovation in the classroom setting toward student academic performance?

Table 1: Embracing Complexity and Innovation Model in the Classroom Setting Among the Respondents

Indicators	WM	I	R
1. It incorporates various instructional teaching strategies in different activities such as group work, individual work, discussion, and lecture, and engages various learning styles.	4.24	SA	1.5
2. It encourages students to move beyond actual problem solving and requires critical thinking, exploring diverse perspectives, and explaining beliefs and positions in the learning process.	4.10	A	5.5
3. It encourages students to create, investigate, discuss, and think rather than simply listening to foster active learning.	3.97	A	12

4. It provides a personalized learning and innovative approach to cater to diverse learning styles and inquiry-based learning to enhance inclusive learning outcomes.	3.82	A	18
5. It collaborates to foster students' engagement in the discussion, learn from other perspectives, knowledge, information, and share ideas.	4.18	A	4
6. It develops student critical thinking by embracing complexity and innovation in diverse learning experiences and inclusivity in the real-world process of the educational system.	4.08	A	7.5
7. It involves fostering and creative active participation in the learning process through various methods of teaching and learning.	3.95	A	13.5
8. It allows students to enhance collaboration on various platforms and share documents to work on various tasks in real-time to foster teamwork in the learning process.	3.38	MA	24.5
9. It creates and fosters inclusive learning, diverse learning, and equitable learning where students are supported and comfortable in the teaching and learning outcomes.	4.00	A	10.5
10. It helps to cultivate constructive feedback and reflection in promoting the skills of critical thinking and problem-solving.	4.10	A	5.5
11. It embraces complexity in understanding the learning environment, such as evolving demands in the community, diverse needs of students, which is crucial in creating efficient, inclusive and diverse learning experiences.	3.85	A	17
12. It fosters optimistic engagement through an inclusive classroom environment in the achievement of better academic performance of students.	4.24	SA	1.5
13. It engages through small and group discussion in an interactive teaching method on problem solving, hands-on experiment, and cooperative learning activities.	4.05	A	9
14. It addresses the leverage of pedagogical teaching approaches and systems in the complexity of classroom learning, inclusivity and diversity in an equitable manner.	3.67	A	23
15. It integrates technology to facilitate advanced and effective learning experiences platforms to provide and improve access personalized learning outcomes.	3.70	A	22
16. It adapts various influences in addressing classroom issues and complexity involvement and acknowledgement for teaching and learning, support, and strategies.	4.20	SA	3
17. It improves communication skills, personalized learning experiences, enhances learning engagement, fosters collaboration, and facilitates discussion.	3.77	A	20
18. It aims to acknowledge and address difficult situations and their impact on students and resources in diverse learning styles and engagement learning outcomes.	3.95	A	13.5
19. It utilizes proper techniques in promoting and fostering problem-solving, critical thinking process and collaboration.	3.74	A	21
20. It clearly defines a learning system to provide student focus and measure learning outcomes, utilization, skills, and knowledge.	3.89	A	16
21. It fosters active discussion in all forms of teaching tasks, such as active participation, critical thinking, and student learning outcomes.	3.80	A	19
22. It recognizes the challenges and diverse needs of students in the management of the classroom context and the impact of students' welfare and well-being.	4.08	A	7.5

23. It utilizes adaptive learning technology to provide personalized learning resources tailored to individual needs of students as centers of learning in various instruction and support.	3.38	MA	24.5
24. It engages innovative methods in teaching for interactive learning to assist the students' active participation process.	3.91	A	15
25. It involves various digital platforms and tools in leveraging technology to enhance learning and teaching.	4.00	A	10.5
Average Weighted Mean	**3.922**	**A**	
Standard Deviation	**0.230**		

Table 1 presents the weighted mean and the corresponding interpretation on embracing complexity and innovation in the classroom setting toward student academic performance among the respondents.

It shows that rank 1 is shared by the two indicators which are "It incorporates various instructional teaching strategies in different activities such as group works, individual works, discussion, lecture, and engages various learning styles", and "It fosters optimistic engagement through inclusive classroom environment in the achievement of better academic performance of students", with a weighted mean of 4.24 or Strongly Agree which means that embracing complexity and innovation model in classroom is highly observed. Rank 2 is "It adapts various influences in addressing classroom issues and complexity involvement and acknowledgement for teaching and learning, support, and strategies", with a weighted mean of 4.20 or Strongly Agree, which means that embracing the complexity and innovation model in the classroom is highly observed. Rank 3 is "It collaborates to foster students' engagement in the discussion, learn from other perspectives, knowledge, information, and share ideas", with a weighted mean of 418 or Agree, which means that embracing complexity and innovation in the classroom is observed. The least in rank is shared by the two indicators which are "It allows students to enhance collaboration on various platforms and share documents to work in various task in real-time to foster teamwork in the learning process", and "It utilizes adaptive learning technology to provide personalized learning resources tailored with individual needs of students as centers of learning in various instruction and support", with a weighted mean of 3.38 or Moderately Agree which means that embracing complexity and innovation model in classroom is limited. The overall average weighted mean is 3.922 (SD=0.230) or Agree, which means that embracing complexity and innovation in the classroom is observed among the respondents.

4.2 How may innovation models embrace complexity in the classroom setting toward student academic performance?

Presented in the section is the thematic analysis of the concurrent Focus Group Discussion (FGD) among the respondents. It is being analyzed based on the answer of the respondents, which is categorizes as follows: 5.00-4.20- Strongly Agree, 4.19-3.40-Agree, 3.39-2.60-Moderately Agree, 2.59-1.80-Disagree, 1.79-1.00-Strongly Disagree. Text

verbatim is included for the analysis of the data on the embracing complexity innovation model in the classroom setting toward student academic performance.

Table 2: Thematic Analysis on Embracing Complexity and Innovation Model in the Classroom Setting Among the Participants

Themes	Response of the Respondents	Core Ideas
1. Fostering Active Participation and Engagement	Agree	• interactive learning • creative active participation • cooperative learning activities • foster active learning
2. Promoting Problem Solving and Critical Thinking	Agree	• student critical thinking • thinking process & collaboration • constructive feedback • diverse perspectives
3. Enhancing Learning Outcome	Agree	• innovative approach • learning system • inclusive learning • effective learning
4. Leveraging Technology	Agree	• various digital platforms • improves communication skills • enhances collaboration • fosters active discussion
5. Addressing Complexity	Agree	• demands in the community • classroom context • teaching approaches • diverse learning styles

4.2.1 Fostering active participation and engagement

Fostering active participation and engagement innovates strategies for utilization of collaborative learning. It designs innovative learning to foster active participation and engagement on various effective teaching strategies to foster active participation, engagement and outcome. It demonstrates a certain concept and understanding through integration of active participation for students' engagement (Zitha *et al.,* 2023). The participants say that:

> *"It engages innovative methods in teaching for interactive learning to assist students' active participation process".* (T1, P46 & P4)

> *"It involves fostering and creative active participation in the learning process through various methods of teaching and learning".* (T1, P43 & P7)

> *"It engages through small and group discussion in an interactive teaching method on problem solving, hands-on experiment, and cooperative learning activities".* (T1, P41 & P9)

"It encourages students to create, investigate, discuss, and think rather than simply listening to foster active learning". (T1, P39 & P11)

4.2.2 Promoting problem solving and critical thinking

Promoting problem solving and critical thinking is essential in the concept and competence of students in the classroom setting practice. It is a reform of the core curriculum teaching and learning toward critical thinking in the field of education and competency knowledge. It improves critical thinking and problem-solving for self-regulation and self-awareness in the teaching process. It helps to develop skills, reason, synthesize, analyze, and interpret information in the promotion of problem-solving and critical thinking (Xu *et al.* 2023, pp. 1-11). The participants say that:

"It develops student critical thinking by embracing complexity and innovation in diverse learning experiences and inclusivity in the real-world process of the educational system". (T2, P48 & P2)

"It utilizes proper techniques in promoting and fostering problem-solving, critical thinking process and collaboration". (T2, P45 & P5)

"It helps to cultivate constructive feedback, reflection in promoting the skills of critical thinking and problem solving". (T2, P43 & P7)

"It encourages students to move beyond actual problem solving and requires critical thinking, explores diverse perspectives, explanations of beliefs, and positions in the learning process". (T2, P40 & P10)

4.2.3 Enhancing learning outcomes

Enhancing learning outcomes compromises the educational process and improvement through valuable insights in the classroom setting. It explores different educational theories to support the learning outcomes of students as centers of learning. It is a regulated learning that provides a comprehensive learning outcome. It discusses the learning outcome to understand the process and utilization of learning outcomes in the educational setting (Alam, 2023, pp 249-257). The participants say that:

"It personalized learning and an innovative approach to cater to diverse learning styles and inquiry-based learning to enhance inclusive learning outcomes". (T3, P46 & P4)

"It clearly defines a learning system to provide student focus and measure learning outcome, utilization, skills, and knowledge". (T3, P42 & P8)

"It creates and fosters inclusive learning, diverse learning, and equitable learning where students are being supported and comfortable in the teaching and learning outcome". (T3, P38 & P12)

"It integrates technology to facilitate advanced and effective learning experiences platforms to provide and improve access to personalized learning outcomes". (T3, P36 & P14)

4.2.4 Leveraging technology

Leveraging technology evolves in the ongoing immense advancement in learning among students. It provides contributions to the educational system, especially among students who are exposed to advanced technology in the teaching and learning process. It becomes the trend in the educational setting. It is a pedagogical educational process in various innovative classroom settings toward the academic performance of students (Kurt-Taspinar & Tikiz-Erturk, 2025, pp. 31-72). The participants say that:

"It involves various digital platforms and tools in leveraging technology in enhancing learning and teaching". (T4, P47 & P3)

"It improves communication skills, personalized learning experiences, enhances learning engagement, fosters collaboration, and facilitates discussion". (T4, P44 & P6)

"It allows students to enhance collaboration on various platforms and share documents to work on various tasks in real-time to foster teamwork in the learning process". (T4, P41 & P9)

"It fosters active discussion in all forms of teaching tasks such as active participation, critical thinking, and student learning outcomes". (T4, P39 & P11)

4.2.5 Addressing complexity

Addressing complexity in a globalized world of teaching and learning reconstructs the approach in the school setting. It addresses sustainability and the complexity of issues pertaining to the educational system. It reveals the interconnectedness of views and understanding of teaching and learning to address complexity in the school system. It focused on reflexivity, multiple perspectives, and a student-centered approach to global educational issues (Taube, 2024, pp. 361-376). The participants say that:

"It embraces complexity in understanding the learning environment, such as evolving demands in the community, diverse needs of students, which is crucial in creating efficient, inclusive and diverse learning experiences". (T5, P43 & P7)

"It recognizes the challenges and diverse needs of students in the management of the classroom context and impact of students' welfare and well-being". (T5, P42 & P8)

"It addresses the leverage of pedagogical teaching approaches and systems in the complexity of classroom learning inclusivity, and diversity in an equitable manner". (T5, P40 & P10)

"It creates to acknowledge and address difficult situations and impact students and resources in diverse learning styles and engagement learning outcomes". (T5, P37 & P13)

5. Discussion

It shows that embracing complexity and innovation in a classroom setting toward student academic performance among the respondents incorporates various instructional teaching strategies in different activities, such as group work, individual work, discussion, and lecture, and engages various learning styles. This includes fostering optimistic engagement through an inclusive classroom environment in the achievement of better academic performance readiness and implementation (Mallillin *et al.,* 2020). It is a complex endeavor in teaching and learning. It suggests developing a professional learning complexity of innovation model in the classroom setting to call for more practice learning. It presents the design and utilization of promising new teaching and learning techniques practice. It identifies complexity and innovative challenges in the classroom setting. It illustrates an actionable approach to design critical thinking in embracing complexity toward student academic performance in teaching and learning practice (Blundell, 2024, pp. 1-19). On the other hand, embracing complexity and innovation in a classroom setting toward student academic performance adapts various influences in addressing classroom issues and complexity involvement and acknowledgement for teaching and learning, support, and strategies. It collaborates to foster student engagement in the discussion, learn from other perspectives, knowledge, information, and share ideas. It allows students to enhance collaboration on various platforms and share documents to work on various tasks in real-time to foster a teamwork learning process. It utilizes adaptive learning technology to provide personalized learning resources tailored to the individual needs of students as centers of learning in various instruction and support. It plays a crucial role in the evolving landscape of the educational system (Kovacevic, 2023, pp. 315-340).

Certainly, fostering active participation and engagement innovates the method in teaching for interactive learning to assist the students' active participation process. It involves fostering and creative active participation in the learning process through various methods of teaching and learning through the integration process (Mallillin *et al.,* 2020). It can be achieved through the sustainable active participation of students as centers of learning. It engages students to develop critical thinking on academic performance through innovation and complexity processes in the classroom setting. It aims to address the gaps and issues in fostering active participation and engagement of students. It initiates active participation and implementation in the educational system for students. It is associated with commitment and implementation of fostering active

participation and engagement in the educational system and setting. It provides a specific measure of engagement for student interest based on motives in the learning process (Filho *et al.,* 2024). Hence, fostering active participation engages students through small and group discussion in an interactive teaching method on problem solving, hands-on experiment, and cooperative learning activities. It encourages students to create, investigate, discuss, and think rather than simply listening to foster active learning. It acknowledges teaching practice and strategies for pedagogical value in passive learning for student engagement in fostering active participation. It enhances teaching strategy in education. It transforms an effective method in fostering active participation and integration of interactive strategies. It describes the active participation of students in connecting interactive lecture strategies with prior knowledge in organizing the order of the lecture method to motivate students in fostering active participation and engagement. It provides an opportunity to practice student devices in the learning process (Thwin & Lwin, 2018, pp. 203-209).

Apparently, promoting problem-solving and critical thinking develops students by embracing complexity and innovation in diverse learning experiences and inclusivity in the real-world process of the educational system. It utilizes proper techniques in promoting and fostering problem-solving, critical thinking, and collaboration. It involves cognitive processes in a systematic critical thinking analysis, interpretation, evaluation, information, and ideas. It promotes valuable information, independent learning, logical reasoning, critical thinking, and the ability to promote problem-solving. It is necessary to cultivate critical thinking and problem-solving to navigate complexity, decision-making, and engagement in teaching and learning. It entails the capacity for critical thinking, logical analysis, and analyzes systematic analysis to explore and empower information with profound insight. It encourages independent thinking and learning (Sindakis, 2023). Constantly promoting problem-solving and critical thinking helps to cultivate constructive feedback and reflection in promoting the skills for students as centers of learning. It encourages students to move beyond actual problem solving and requires critical thinking, exploring diverse perspectives, explaining beliefs, and positions in the learning process. It evolves in the landscape of knowledge to succeed interconnectedness in increasingly complex innovation. It develops students ' ability to solve issues and think critically in the classroom setting, toward academic performance. It is centered on the academic performance of students through the critical thinking and problem-solving process. It explores the necessary skills in the various domains of learning and practical methods in fostering problem-solving and critical thinking. It is the product of the imagination and critical thinking of students to improve academic performance through embracing complexity and innovation models (Kumar & Dewra, 2023).

Indeed, enhancing learning outcomes personalizes and innovates an approach to cater to diverse learning styles and inquiry-based learning to enhance inclusive learning outcomes. It clearly defines a learning system to provide student focus and measure learning outcomes, utilization, skills, and knowledge. It explores programs of the educational system and the development of the learning application process. It explores

the concept of enhancing learning outcomes through participatory engagement, support, collaboration, and interaction. It interprets the limit of enhancing learning outcomes in various contexts and implementation in the classroom setting. It is limited to various contexts, strategies, and methods in the learning outcomes of students. It implements various technologies in teaching and learning. The learning outcome improves through critical thinking, self-reflection, an active participation process, content, understanding, and sharing ideas. It designs and guides effective learning through adaptive techniques and integration of teaching techniques (Wagino *et al.,* 2024). Notably, enhancing learning outcomes creates and fosters inclusive learning, diverse learning, and equitable learning where students are being supported and comfortable with teaching. It integrates technology to facilitate advanced and effective learning experience platforms to provide and improve access to personalized learning outcomes. It addresses effective teaching and needs to enhance student outcomes in learning strategies. It implements and examines effective learning outcomes through problem-based learning to improve the academic performance of students by embracing complexity and innovation models in the classroom setting toward achievement of academic performance. It improves learning outcomes in the application of students as centers of learning. It enhances the model of effective learning outcome implementation of positive teaching among students (Sarifah, 2024).

Furthermore, leveraging technology involves various digital platforms and tools in enhancing learning and teaching. It improves communication skills, personalized learning experiences, enhances learning engagement, fosters collaboration, and facilitates discussion. It significantly influences technological advancement in the educational system. It is characterized by the technology integration to embrace complexity and innovation in the classroom setting. It faces various opportunities and challenges in creating technology learning experiences. Leveraging technology is crucial in molding and shaping advanced learning in building society to the fullest. It provides rapid technology development and integration for the opportunity to address challenges in the educational system. It explores utilization of enhancing advanced technology experiences. It is focused on the assessment of the positive impact of student engagement, skills development, and academic achievement (Gunawan & Danika, 2023, pp. 121-137). Furthermore, leveraging technology allows students to enhance collaboration on various platforms and share documents to work on various tasks in real-time to foster teamwork learning processes. It fosters active discussion in all forms of teaching tasks, such as active participation, critical thinking, and student learning outcomes. It describes the content of advanced pedagogy in technology principles, framework, and knowledge. It is the process of curriculum design to improve the educational system through the technology process and leverage. It leverages technology to support critical thinking in student development and the learning process. It provides an evaluation of the roadmap for leveraging technology to reinforce higher-level learning of student thinking processes. It examines the leverage of technology, transformative educational systems and the role for sustainable development goals and innovation (Mejia & Sargent, 2023, pp. 393-418).

Similarly, addressing complexity in the educational system embraces understanding the learning environment, such as evolving demands in the community, diverse needs of students, which is crucial in creating efficient, inclusive and diverse learning experiences. It recognizes the challenges and diverse needs of student management in the classroom context and the impact of student welfare and well-being. It presents various perspectives and definitions to constitute development and professional learning for students as centers of learning. It describes professional development and continuous service for teachers' learning. It reflects complexity in embracing innovation models for the classroom setting toward student academic performance and process. It allows us to understand the process complexity and the innovation system. It engages with the experiences of professional development in addressing and embracing complexity and innovation in classroom setting models (King *et al.,* 2023, pp. 958-977). Lastly, addressing complexity in the educational system addresses pedagogical teaching approaches and process complexity of classroom learning, inclusivity and diversity in an equitable manner. It aims to acknowledge and address difficult situations and impact students and resources in diverse learning styles and engagement learning outcomes. It explores addressing teacher role and competency challenges in the sustainable learning global educational system and process. It highlights the improved quality of teachers in overcoming the standard of the educational system and the process to equip them with a quality school system. It strengthens the professional competency of teaching pedagogy in enhancing the process of the school system. It prioritizes teaching competency in facing challenges of sustainable learning to produce global outcomes in the educational system (Kusnandi, 2024, pp. 271-283).

6. Conclusions

It shows that embracing complexity and innovation in a classroom setting toward student academic performance incorporates various instructional teaching strategies in different activities, such as group work, individual work, discussion, and lecture, and engages various learning styles, fostering optimistic engagement through an inclusive classroom environment and achieving better academic performance of students.

It shows that fostering active participation and engagement innovates the method in teaching for interactive learning to assist students' active participation process and involves fostering a creative active participation learning process through various methods of teaching and learning, where it engages through small and group discussion, interactive teaching method on problem solving, hands-on experiment, and cooperative learning activities.

It shows that promoting problem solving and critical thinking develops students critical thinking by embracing complexity and innovation in diverse learning experiences and inclusivity in the real-world process of the educational system, where it utilizes

proper techniques in promoting and fostering the problem-solving and critical thinking process and collaboration.

It shows that enhancing learning outcomes personalizes and innovates approaches to cater diverse learning styles and inquiry-based learning to enhance inclusive learning outcomes, where it clearly defines a learning system to provide student focus and measure learning outcomes, utilization, skills, and knowledge.

It shows that leveraging technology involves various digital platforms and tools in leveraging technology in enhancing learning and teaching, where it improves communication skills, personalized learning experiences, enhances learning engagement, fosters collaboration, and facilitates discussion.

It shows that addressing complexity embraces understanding learning environments, such as evolving demands in the community, diverse needs of students, which is crucial in creating efficient, inclusive and diverse learning experiences, where it recognizes the challenges and diverse needs of students in the management of the classroom context and impact of students' welfare and well-being.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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