Kolb's Experiential Teaching Approach (KETA): Effects On Grade 8 Students' Academic Performance And Motivation In Chemistry

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ABSTRACT

This study aimed to investigate the effects of Kolb's Experiential Teaching Approach (KETA) on Grade 8 students' academic performance and motivation in Chemistry. It employed quasi-experimental design. The participants were two intact sections of Grade 8 students of MSU-LNCAT. The findings revealed that the difference in the control and experimental groups' academic performance test mean scores after the intervention was significant. In addition, there was a significant difference between the control and experimental groups' motivation after the intervention. All of the students in both groups had demonstrated less academic performance and low motivation in Chemistry prior to the intervention. However, after the intervention, most of the experimental group improved their academic performance and motivation in Chemistry, while only a few in the control group did. Furthermore, the experimental group of students perceived that KETA enhances learning and understanding, fosters motivation and engagement, builds a supportive learning environment, promotes hands-on and interactive learning, and recognizes challenges in learning. This ascertains that the experimental group of students' academic performance and motivation in Chemistry were found to be enhanced by the Kolb's Experiential Teaching Approach (KETA). Hence, school administrators, curriculum developers, and teachers should incorporate KETA into their practice tests in educational and training contexts.

Keywords: *Kolb Experiential Teaching Approach, Academic Performance, Motivation*

INTRODUCTION

Chemistry greatly influences people's lives. It has significantly altered the way they live. It can be found in the food they eat, the clothes they wear, the gadgets they own, or, to put it another way, in the simple and complex things in the environment. Despite all the outstanding advances in Chemistry, it should be remembered that nearly everyone, even scientists, first learned Chemistry in school. Therefore, students' scientific knowledge and abilities should be considered. This has led to changes in the quantity and quality of the science curriculum in high schools, allowing them to keep up with the changing times (Refugio et al., 2020). In fact, the academic performance of students has always been monitored by educators, especially when it comes to Chemistry, as it is one of the driving forces of a country's development and a fundamental key in resolving global issues.

However, even though Chemistry is the most industrially relevant science and covers every aspect of human endeavor and natural phenomena, most students generally consider it a difficult subject. These impressions could be ascribed to students' abstract ideas of Chemistry which they believe are unconnected to the real world. Chemistry topics are highly conceptual and require higher-level skills, including memorization and recall of facts and data. These negative impacts reflect students' failure to retain the basic principles of Chemistry and the decline in their academic performance in science (Sibomana et al., 2021).

Motivation plays a crucial role in learning. It energizes the individual's behavior and directs it towards specific goals. It helps students acquire knowledge, develop social qualities, increase initiation, persist in activities, improve performance, and develop a sense of discipline (Ryan & Deci, 2020). Some learners rarely went to school, and the worst case was dropping out of school because of insufficient motivation they had inside themselves. This is a great challenge for teachers, which has encouraged many researchers to study the factors that affect the motivation of learners. Educators have adopted and tried diverse instructional techniques, strategies, approaches, models, and frameworks to increase the motivational level of their learners and improve their teaching instruction.

Additionally, to survive and make a positive contribution to society, which is characterized by an increasing rate of complex changes, uncertainties, challenges, and problems, students are encouraged to develop 21st century skills such as creativity, collaboration, communication, and critical thinking, which can be achieved when the students are actively involved and engaged in the learning process. Moreover, experiential learning is a strategy in education that provides hands-on experiences to put concepts and strategies into practice.

For educators, there has always been a problem with how well students learn and the strategies they use to learn. Experiential learning gives students the chance to apply the knowledge they have to develop self-efficacy and learn from experiential undertakings. In fact, it differs from the simple dissemination of knowledge. Experience must be continuous and interactive, where one experience leads to additional experiences, encouraging an individual to learn more. The concept of experiential learning holds that learning is an inevitable byproduct of experience and that experiences are created via each learner's interaction and engagement with the world around them.

One important component of Kolb experiential learning, according to David Allen Kolb, is that learning occurs or knowledge is acquired as a result of direct involvement in the pedagogical approach. In essence, Kolb examined four stages in the learning cycle in his model: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation

(AE). Additionally, the learner can join the cycle at any point in a logical sequence. Experience can become knowledge when the cycle is completed. Kolb's model recognizes that for an experience to qualify as learning, something must be generated from it (Gobeil, 2021).

Likewise, shifting from teacher-centered to learner-centered is the trend in the 21st century. The researcher believes that Kolb's experiential learning is one of the appropriate theories of education nowadays when it comes to hands-on activities where the student may get the chance to actually manipulate the activity and interact with the environment in order to adopt and learn while the teachers serve as facilitators. In view of this, the researcher believes that implementing Kolb's Experiential Learning phases through KETA may promote higher academic performance as well as stimulate students' motivation in Chemistry.

METHOD

This study used a mixed-methods research design to investigate the effects of the Kolb Experiential Teaching Approach (KETA) on the academic performance and motivation of Grade 8 students in Chemistry. Quantitative data were gathered through pretests, posttests, and the Chemistry Motivation Questionnaire (CMQ), while qualitative data were collected through interviewing ten (10) selected respondents from the experimental group to record and analyze their perceptions and insights regarding the use of KETA.

A quasi-experimental matching-only pretest-posttest control group design was used. Two Grade 8 sections served as the study participants. Students were matched according to their Chemistry grades from the first three quarters of SY 2023–2024. One section was assigned as the experimental group, which received instruction through KETA, while the other served as the control group, which received conventional teaching. Group assignment was determined through coin tossing.

The study was conducted at MSU-LNCAT in Marawi City, Philippines. Participants were Grade 8 students enrolled during SY 2023–2024. Non-matched students participated in class activities but were excluded from data analysis.

Several research instruments were utilized in this study. The Chemistry Academic Performance Test (CAPT), a researcher-made instrument composed of 55 items after pilot testing and item analysis. The instrument demonstrated good reliability, with a Cronbach's alpha coefficient of .838. The Chemistry Motivation Questionnaire (CMQ), adapted from the study of Huda and Rohaeti (2023). To gather qualitative data, an Interview Guide containing five open-ended questions was used to explore the students' perceptions of the Kolb Experiential Teaching Approach (KETA). Additionally, student journals and field notes were employed to document students' learning experiences, observations, and perceptions throughout the intervention.

Data collection was conducted in three phases: pre-intervention, intervention, and post-intervention. During the pre-intervention phase, the research instruments were developed, validated, and pilot-tested. Lesson plans were also prepared, and the necessary permissions to conduct the study were secured. In the intervention phase, both the experimental and control groups studied the same Chemistry topics, namely the Particle Nature of Matter, Atomic Structure, and the Periodic Table of Elements. However, the experimental group received instruction through the Kolb Experiential Teaching Approach (KETA), which followed Kolb's four-stage experiential learning cycle: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. In contrast, the control group was taught using the conventional teaching approach. During the post-intervention phase, the CAPT and CMQ were administered as posttests to assess students' academic performance and motivation in Chemistry. Furthermore, ten students from the experimental group were interviewed to gain deeper insights into their experiences and perceptions regarding the use of KETA in the teaching-learning process.

Data analysis was conducted using SPSS. Descriptive statistics summarized the data, while independent-samples t-tests compared academic performance, Mann-Whitney tests compared motivation levels, and Spearman's rho examined the relationship between performance and motivation. Qualitative data were analyzed using Thematic Concept Analysis.

The study adhered to strict ethical standards, including informed consent, voluntary participation, confidentiality, anonymity, data security, protection of student welfare, institutional approvals, ethical clearance, and honest reporting of findings.

FINDINGS AND DISCUSSION

Control and Experimental Groups of Students' Academic Performance Test Mean Scores before and after Intervention and the Mean Gain Scores

Table 1:
Mean Score, Mean Gain Score and Standard Deviation of the Control and Experimental Groups of Students' Academic Performance in Chemistry Topic Domains before and after Intervention

Period	Group (n=25)	Mean Score	Mean Gain Score	SD
Before Intervention	Control Experimental	15.96 14.28		2.09 1.95
After Intervention	Control Experimental	32.12 40.32		4.26 3.90
	Control Experimental		16.16 26.04	5.34 4.23

As shown in Table 1, before the intervention, the mean score of the control group was slightly higher than that of the experimental group, which means that the control group performed well during the pretest compared to the experimental group, although both groups had little prior knowledge of the subject matter. This implies that the students had less prior knowledge of the concepts and principles of the covered topic domain. Some of the topics were unfamiliar to them, while some had already been discussed at the elementary level but were eventually forgotten due to inadequate discussion, resulting in difficulty in comprehension. Some considered Chemistry as a hard and boring subject, and the strategy or method used by their previous teacher was ineffective in the enhancement and retention of information. It got even worse when modular learning was implemented as the primary mode of instruction during the pandemic, particularly in areas with limited internet access.

Because the topics were not covered in their previous grade level, students claimed to know nothing about Chemistry. They found the subject dull. Furthermore, some students revealed that Chemistry is a challenging subject and they knew nothing about it because they encountered it during the pandemic, when modular learning was the only effective teaching method. This is consistent with the study of Sibomana et al. (2021), who stated that Chemistry is a challenging subject to learn, and students continue to see Chemistry negatively and believe it is a tough subject to learn. They find it challenging to learn and feel ineffective when they are involved in it.

Meanwhile, after the intervention, the post-test mean score of the experimental group was higher than the mean score of the control group, which is in contrast with the result of the pre-test. This means that the academic performance of the experimental group improved after the intervention. This improvement can be attributed to the implementation of the Kolb Experiential Teaching Approach (KETA) using the Kolb Experiential Learning Cycle. This is consistent with the study of Geyser et al. (2020), who asserted that in the life sciences classroom, students' performance significantly improved when experiential learning was used. There was an instantaneous difference, and improvement was evident when an outcome was reached or a lesson utilizing experiential learning was concluded. Coherently, Chan et al. (2021) and Burch et al. (2019) claimed that Kolb experiential learning is a powerful learning method because it involves the entire person by integrating the senses, intellect, and emotions, which enhances memory retention. In addition, the experimental group had a higher mean gain score than the control group. This implies that the academic performance of the experimental group was better than that of the control group. Additionally, the standard deviation of the experimental group was lower than that of the control group. This suggests that the experimental group's academic performance was more evenly developed.

Moreover, the control group received instruction using the Conventional Teaching Approach. The respondents served as passive learners who sat down and listened to the discussion. Answer the questions coming from the teacher and do the activities and worksheets implemented which are aligned to the K to 12 curriculum. This monotonous way of teaching made the respondents bored and later declined their academic performance in Chemistry. This is in line with Gobeil et al. (2022), who asserted that most of the time, students listen and talk only when they are given permission to speak. Additionally, when students were asked how they felt during the session, they used words such as oppressed, devalued, and bored. Conventional learning methods, such as theoretical textbook learning, are no longer effective when they are not applied. Education with no real-world applicability is perpetually poor (Taneja et al. 2022).

The experimental group, on the other hand, was implemented with the Kolb Experiential Teaching Approach (KETA) using the Kolb Experiential Learning Cycle, which required the students to put what they had learned into practice and actively engage in the teaching-learning process. The respondents were exposed to different environments and strategies, which led to the formation of new experiences and enhancement of their academic performance. This agrees with Suanto et al. 's (2019) study, which highlighted that experiential learning involves students participating in the subject matter throughout all four stages of Kolb's Learning Cycle, which can help them develop higher-order thinking skills. Morris (2020) pointed out that involving a child in a comprehensive learning experience, solving problems, and putting the material into practice through hands-on learning improves their performance and capacity for critical thought.

Comparison of Control and Experimental Groups of Students' Academic Performance Test Mean Scores before and after Intervention and the Mean Gain Scores

As shown in Table 2 on the next page, the result signifies that before the intervention, there was a significant difference between the control and experimental groups' academic performance test mean scores in favor of the control group. This may be due to the previous learning experiences of the students, as the two groups had different teachers before the intervention, and several students from the control group were transferees, which might have given the control group of students more baseline knowledge about Chemistry in contrast to the experimental group. This agrees with the study of Sibomana et al. (2021), who stated that teachers control how educational instruction is delivered and have the ability to affect teaching-learning outcomes. Coherently, the findings of Brew and Koranteng (2021) claimed that teachers have a significant impact on students' academic success at school.

Table 2:
t-test and Significance (p) Values on the Comparison of Control and Experimental Groups of Students' Academic Performance Test Mean Scores before and after Intervention and the Mean Gain Scores

Period	Group	t-test	
		t-value	p-value
Before Intervention	Control (n=25)	-2.94	.01(s)
	Experimental (n=25)		
After Intervention	Control (n=25)	7.10	.00(s)
	Experimental (n=25)		
Mean Gain Score		7.26	.00(s)

Note. s – significant at .05 level

In addition, test administration condition is another factor that affected this result as the experimental group of students were distracted during the pretest. Students wanted to go out as early as possible because of their practice for a certain activity. Additionally, outside the room of the experimental group was very noisy because of other grade-level students' activities. Therefore, they may not have answered the pretest correctly. This is supported by the field notes of the researcher during the administration of the pretest, which recorded that the students in the experimental group completed the questionnaire without using up all of the allotted time. They appeared to have been rushing to complete the test so they could leave and rehearse for a particular activity for their next period. Additionally, the students outside the room caused so much noise by playing drums, xylophones, and talking loudly, which made the students agitated and distracted.

This is consistent with the study of Braat-Eggen et al. (2021), who pointed out that sound scenarios had a significant impact, causing disruption on both self-estimated performance and reading comprehension tasks using students' text memory. Similarly, Braat-Eggen et al. (2019) indicated that students were more influenced by the sound environment, resulting in significantly lower writing performance. Additionally, it should be recognized that students may need extra processing time even if they can block out noise in terms of performance (Prodi et al., 2019; Schiller et al., 2020).

Meanwhile, after the intervention, there is a significant difference between the control and experimental groups of students' academic performance test mean scores as well as the mean gain score in favor to the experimental group, demonstrating the positive impact of the Kolb Experiential Teaching Approach (KETA). This indicates that the integration of the experimental group of students into KETA yielded a notable increase in the students' academic performance in Chemistry. Students were engaged with hands-on and learner-centered activities and were exposed to meaningful learning experiences, which gave them the chance to put what they had learned into practice, resulting in the retention and enhancement of knowledge.

Some students emphasized that the discussions and activities where they could manipulate the materials helped them to visualize the concepts being discussed and led them to understand the lesson. In this regard, Amaya et al. (2020) emphasized that the use of more interactive, hands-on, or activity-oriented teaching gradually raises retention rate techniques and improves students' academic performance. Similarly, Ngan and Hong (2021) confirmed that using Kolb's experiential learning served as the basis for the science teaching model effectively nurtured the students' competencies. In other words, there is a legitimate and obvious connection between using Kolb's experiential learning and the development of students' academic performance.

Furthermore, because the results prior to the intervention were significant, ANCOVA was used to determine whether the pretest had an impact on the posttest.

Table 3:
Tests of Between-Subjects Effects

Source	Mean Square	F	p-value
Group	5.034	.309	.581 (ns)

Note. ns – not significant at .05 level

Table 3 presents the ANCOVA results, which indicate that there is no significant effect, meaning that the pretest does not impact the posttest scores. This suggests that the pretest variable does not contribute to explaining any variations in the posttest outcome, and that any changes observed in the posttest scores are not attributable to the pretest. Therefore, it can be concluded that the pretest had no meaningful influence on posttest performance.

Control and Experimental Groups of Students' Motivation in Chemistry before and after Intervention

Table 4:
Number and Percentage Distributions of Control and Experimental Groups of Students' Motivation in Chemistry before and after the Intervention

Category	Before		After	
	Experimental (n=25)	Control (n=25)	Experimental (n=25)	Control (n=25)
Very low	1 (4%)	4 (16%)	0 (0%)	0 (0%)
Low	14 (56%)	17 (68%)	0 (0%)	1 (4%)
Medium	8 (32%)	4 (16%)	0 (0%)	16 (64%)
High	2 (8%)	0 (0%)	2 (8%)	8 (32%)
Very high	0 (0%)	0 (0%)	23 (92%)	0 (0%)
Total	25 (100%)	25 (100%)	25 (100%)	25 (100%)

Note. Very low: 0-20%; Low: 21-40%; Medium: 41-60%; High: 61-80%; Very high: 81-100%

As shown in Table 4, prior to the intervention, the results indicated that the majority of the students in both groups were in the low motivation category. The reason behind this result is the lack of knowledge of the students about the concepts under Chemistry and its significance in life, with the fact that some of them considered it a difficult and boring subject. Students were not motivated to learn Chemistry because the lessons had not been adequately covered in their prior years. They are unaware of its significance and advantages in their life. In addition, some students eventually came to view Chemistry as a difficult and dull subject because they did not comprehend the topics covered in it. This is coherent with the study of Sibomana et al. (2021), who claimed that the lack of connection between Chemistry and one's own life is a significant factor in students' demotivation in the subject. When teachers explain ideas, some students question their significance in their lives because they are unable to relate chemical principles to everyday life. Similarly, Santos et al. (2021) claimed that if a student lacks motivation, they are likely to attend class incorrectly, act out of convenience, and fail to achieve their goals.

Furthermore, after the intervention, it can be gleaned that there is an improvement in the motivation of both groups since the majority of the categorization of the students increased from low motivation to medium motivation for the control group while from low motivation to very high motivation category for the experimental group. However, it is evident that the students in the experimental group were more motivated than those in the control group after the intervention.

In addition, the control group appeared to have slightly increased their motivation in Chemistry which means that the Conventional Teaching Instruction can foster the motivation of students but not as effective as the exposure to Kolb Experiential Teaching Approach (KETA). Congruently, students who are insufficiently motivated may be those whose needs are not being met in the classroom. In fact, even a student who does not seem motivated can actively participate in the learning process if classroom activities meet their needs. However, not understanding the lesson and having many difficult activities are not advisable since they can lead to students' exhaustion and weariness.

Some students thought that some of the tasks assigned to them were challenging, particularly when they failed to learn the lessons, and there were too many activities, which left them feeling worn out. Additionally, because they did not grasp parts of the teachings due to their classmates' chitchat, they grew lazy when answering challenging activities and lost concentration on the discussion. Kwarikunda et al. (2020) asserted that students who lack motivation are more likely to be disinterested, struggle to establish and maintain a structured study routine, struggle to manage learning resources, and achieve lower levels of achievement. Similarly, Dokme and Benzer (2020) stated that most disengaged students do not intentionally interrupt class; instead, they tend to be unmotivated and off-task, which does not draw the teacher's attention to their behavior.

On the other hand, highly motivated students exhibit commitment and enthusiasm in their work, which was evident in the students in the experimental group exposed to KETA. Students actively participate in learning tasks and use active learning strategies to integrate their prior knowledge with new experiences because they believe the tasks given to them are valuable and meaningful in their lives. Additionally, students are motivated to learn when concepts are discussed properly and they are given the chance to observe, participate, and experience learning exercises. When learners set goals for themselves, they are driven by internal motivation, which leads them to aim to fulfill their requirements for strengthening their own proficiency.

Students were engaged in active learning with the help of the activities under the Kolb experiential learning cycle and understood the misconceptions through the discussion of the teacher, which led them to feel more motivated to learn Chemistry. The activities showed practical relevance to their everyday lives and addressed their curiosity about certain topics, making the lessons more interesting due to their applicability. This is parallel to the study of Taneja et al. (2022), who emphasized that learning is influenced by real-world or virtual experiences as well as practical, hands-on activities. Experiential learning encourages students to experiment with their ideas, create new ideas, and examine their implementation.

Comparison of Control and Experimental Groups of Students' Motivation in Chemistry before and after Intervention

Table 5:
Median, Mann Whitney U-test, and significance (p) values on the Comparison of Control and Experimental Groups of Students' Motivation in Chemistry before and after Intervention

Difference		Median	Mann-Whitney U-Test	p-value
Before intervention	Experimental	3.0	181.5	.00(s)
	Control	2.0		
After intervention	Experimental	5.0	6.0	.00(s)
	Control	3.0		

Note. s – significant at .05 level

As shown in Table 5, the median of the control group (2.0) and experimental group (3.0) had a Mann-Whitney U-Test of 181.5 and a p-value of .00, which is significant ($p<.05$) at the.05 level of significance before the intervention. This indicates that the null hypothesis was rejected. On the other hand, after the intervention, the median of the control group, which was 3.0, and the experimental group, which was 5.0, had a Mann-Whitney U-Test of 6.0 and a p-value of .00, which is significant ($p<.05$) at the.05 level of significance. This indicates that the null hypothesis was rejected. This result indicates that there is a significant difference in the students' motivation in Chemistry between the two groups in favor of the experimental group before and after the intervention.

Additionally, because the two groups had different teachers prior to the intervention and some of the students in the control group were transferees, it is possible that the students' prior learning experiences contributed to their motivation in Chemistry. A notable distinction can be seen in the median, which denotes that the experimental group significantly increased from 3.0 to 5.0, while the control group had 2.0 to 3.0 before and after the intervention, respectively. This could be a result of how the lesson was taught and the classroom activities were carried out. According to this data, it can be concluded that the treatment given to the experimental group of students was effective in boosting their motivation in Chemistry and therefore gained a higher median compared to the control group.

The control group of students' motivation following the intervention shows that there is an increase in their motivation in Chemistry but not as high as the experimental group. Because some of the Chemistry lessons were challenging, the students were not always interested and motivated in learning them. Students are disinterested in the teaching methodology of the teacher which involved discussion followed by an activity and then a discussion again before the activity. They desired hands-on activities. This is coherent with the study of Filippello et al. (2020), who emphasized that since there is no autonomy in the learning environment, students' internal motivational systems and the desire for voluntary interest are weakened, students will thereafter lose interest in the course material, and become less intrinsically motivated to study, all of which will lead to poor academic performance. Similarly, Pratt et al. (2022) found that students with less autonomy are more likely to feel demotivated as a result of fewer opportunities to show their abilities or connect with peers or the teacher.

However, exposure to the Kolb Experiential Teaching Approach (KETA) allowed the experimental group of students to apply meaning to their experiences through reflection and created an improved and better experience. It actively places students in an environment where knowledge can be directly applied through hands-on activities and allows them to witness its practical applications, which triggers their interest and eventually fosters motivation. Some students expressed how they enjoyed the activities that allowed them to observe the materials up close, and how they even facilitated communication and teamwork among their less close classmates. The experimental group of students' responses in the interview expressed a strong motivation to learn Chemistry following their experience with KETA, attributing this to the engaging activities that sparked their interest in the lessons. They appreciated that these practical experiences allowed them to apply prior knowledge while exploring new concepts, indicating that active engagement is key to their motivation in Chemistry. Likewise, the findings of Aykan and Dursun (2022) noted that engaging in active learning activities boosted participants' confidence and encouraged participation. Coherently, Chan et al. (2021) stated that introducing students to experiential learning will motivate them to reflect on the experience to transform and create new skills.

Correlation Between the Student's Academic Performance and Motivation in Chemistry in both Control and Experimental Group

Table 6:
Correlation Coefficient and p-value of Students' Academic Performance and Motivation in Chemistry in both Control and Experimental Group

Relationship		Correlation coefficient	p-value
Academic performance	Motivation (before)	-.25	.08 (ns)
	Motivation (after)	-.79	.00(s)

Note. ns– not significant at .05 level; s – significant at .05 level

The results imply that there was no significant relationship between the students' academic performance and motivation in Chemistry prior to the intervention. According to Tables 1 and 4, the control group of students had higher academic performance than the experimental group, but the majority of them had low motivation in Chemistry, while the experimental group had lesser academic performance than the control group, and the majority of them had low motivation in Chemistry. These results indicate that what happens to the students' academic performance does not correlate with their motivation in Chemistry prior to the intervention.

Motivation does not always correlate with academic performance. Motivation can be intrinsic (driven by interest) or extrinsic (focused on rewards, such as grades). While intrinsic motivation tends to support deeper learning, extrinsic motivation may lead to surface-level engagement or a focus on grades rather than true understanding of the subject. Sometimes, students who are extrinsically motivated may not perform well academically if external rewards do not align with their long-term academic goals. Students claimed that they were only motivated to study and listen to the discussion because they thought there would be a quiz or activity afterwards. Moreover, motivation alone does not guarantee effective study habits or academic success.

A motivated student might still perform poorly if they do not use effective learning strategies, such as active recall, spaced repetition, or critical thinking. A lack of time management skills or poor organization can undermine academic performance. Students may be highly motivated but may not be able to perform well if the teaching methods do not align with their preferred learning style. For instance, a student who is a hands-on learner may struggle in a lecture-heavy environment, even if they are deeply motivated to learn. Overwork or burnout can disrupt academic success. It diminishes performance over time due to exhaustion, loss of interest, or inability to maintain consistent effort. This is consistent with the study of Tus (2020) who examine the students' motivation and their relationship with their academic performance and yielded a finding stating that there is no significant relationship between motivation and students' academic performance.

As shown in Tables 1 and 4 of the previous pages, after the intervention, the control group of students had lower academic performance than the experimental group, and most of them were categorized under medium motivation in Chemistry, while the experimental group had higher academic performance than the control group, and nearly all of them were categorized under very high motivation in Chemistry. These results suggest that as the academic performance of the students increases, their motivation also increases, and vice versa.

Motivation is strongly correlated with academic performance because it directly influences students' effort, engagement, and approach to learning. Motivated students tend to invest consistent effort, persist through challenges, and actively engage with course material, leading to a deeper understanding and better information retention. They are also more likely to develop effective study habits, manage their time well, and set clear academic goals, all of which enhance their preparation for exams and assignments. Motivation fosters self-regulation, wherein students monitor their progress and adjust their strategies, contributing to improved outcomes. Furthermore, motivated students are more resilient in the face of setbacks, viewing challenges as opportunities for growth rather than as obstacles. Intrinsically motivated learners, driven by genuine interest in the subject, are particularly inclined to engage in deep learning, resulting in higher academic performance. Motivation cultivates a positive mindset and boosts self-confidence, helping students develop a growth mindset that encourages persistence and improvement. Overall, motivated students are more focused, adaptable, and proactive, contributing to sustained academic success.

Students shows that they learned about the distinctions between the states of matter because they were inspired and motivated to complete the task by each other's enthusiasm, which helped them enjoy the exercise. Motivation is one of the most crucial elements influencing learning and achievement. Students who were very motivated to learn the subject performed well academically in the subject matter compared to those who were not as motivated. This is congruent with Altiparmak and Eryilmaz's (2021) study, which showed that one of the most significant factors influencing students' behavior in the classroom is motivation, which governs how they will behave and how quickly and intensely they will work to achieve their goals. Similarly, Dokme and Benzer (2020) revealed that highly motivated students typically put forth more effort and determination than less motivated students in class activities and assignments.

Students' Perception on the use of Kolb Experiential Teaching Approach (KETA) in Teaching and Learning Chemistry

The experimental group of students expressed their insights on the use of the Kolb Experiential Teaching Approach (KETA) through their journals and interviews. The following are the global themes acquired after the rigorous analysis of the transcribed and translated responses of the students from the interview:

Enhances Learning and Understanding

The responses of some of the students when asked if the Kolb Experiential Teaching Approach (KETA) helped them to understand the ideas and concepts in Chemistry reveal that KETA significantly contributed to their understanding of Chemistry by combining hands-on experiments, discussions, and collaborative activities. The practical approach allowed them to visualize complex concepts, making them easier to understand and remember. The hands-on activities, especially those conducted at various stations, helped them not only learn but also deepen their understanding of the underlying principles. Their activities also fostered teamwork, enabling them to share ideas with their classmates and clarify any doubts. Meanwhile, the intervention made abstract concepts more tangible, helped them become familiar with Chemistry-related terminology, and made challenging topics, such as states of matter, more understandable. Overall, KETA enhanced their interest in Chemistry and prepared them to apply these lessons in the future.

Experiential learning enhances the transfer of knowledge to students. Students gain a more comprehensive understanding of the material by practically experiencing it, rather than just reading and speaking about it. This is consistent with the study of Behrendt and Machtmes (2021), who asserted that the Kolb experiential learning cycle starts with a concrete experience where the students are given certain experiences related to the topic domain, followed by reflecting on what was seen, critically analyzing the observations to create abstract concepts, experimenting with those new concepts, and finally testing through another concrete experience. Parallel to this, Gobeil (2021) posited that experiential learning is contrasted with students who only read about, hear about, talk about, or write about these realities but never come into contact with them as part of the learning process.

Fosters Motivation and Engagement

This theme is affirmed by the field notes of the researcher, which recorded that the students enjoyed the intervention, as evidenced by their actions and attitudes, as some of them were excited and eager to participate in the activities. They even had fun with their classmates. Some of them said that they love doing their activities because, aside from learning from it, they also enjoy it.

When students find Chemistry interesting and fun by engaging them in interactive and enjoyable learning experiences, their intrinsic motivation increases, leading to greater participation and a more positive attitude, such as excitement and enjoyment, ultimately enhancing their learning outcomes. Conversely, confusion or frustration can diminish the enthusiasm. Consequently, it is important to recognize students' enthusiasm and positive attitudes toward Chemistry.

Some students expressed heightened motivation to learn Chemistry, particularly through the use of KETA, which they found engaging and effective in deepening their understanding. They emphasized that activities such as the demonstration of charge attraction using a comb and small pieces of paper helped make abstract concepts more tangible and interesting. Their curiosity was especially piqued by topics such as the arrangement of elements in the periodic table, and through KETA, they gained a clearer understanding of its structure, enhancing their previous knowledge. Their enthusiasm for the subject has only grown stronger, as they believe the lessons learned will be applicable in their future studies and everyday life. Overall, the use of KETA significantly contributed to the students' motivation and understanding of Chemistry. This is coherent with the study of Morris (2020), which highlighted that students actively participate in the learning process through experiential learning. It is a "hands on," task-oriented approach that relies on firsthand experience and demands active participation from students.

Builds a Supportive Learning Environment

This theme emphasizes that KETA necessitated students seeking additional help and resources when facing challenges. Whether through teachers or peer support, accessing the right resources is crucial for bridging knowledge gaps and improving understanding of the subject matter. Students found the KETA activities both enjoyable and educational, particularly because of the strong teamwork and cooperation with their groupmates. They appreciated how their peers shared their knowledge, helping them to overcome the initial challenges of certain activities. For example, while the students struggled to understand some Chemistry concepts at first, the explanations from their groupmates allowed them to grasp the lessons more clearly. Moreover, they asserted that the collaborative nature of the activities fostered closer relationships within the group, even encouraging participation from quieter or introverted classmates who were typically less engaged. This not only made the activities more fun, but also created a more inclusive and supportive learning environment for the students. This agrees with the study of Sugano and Nabua (2020), who asserted that students learn best when they are given the opportunity to collaborate with their peers to complete a task. With this approach, students can freely produce and share ideas and engage with one another. In terms of achievement, cooperative learning is thought to be more effective than the traditional approach.

Promotes Hands-On and Interactive Learning

Students expressed a strong preference for learning methods that actively engaged them, such as visual aids and practical experiments. This engagement leads to better retention of information and a more profound understanding of Chemistry as students connect theory with practice. When students engage in hands-on activities, they are better prepared for experiments and real-world applications in Chemistry. Students see the value of learning Chemistry through real-world applications, whether in health, cleanliness, or everyday occurrences. This practical focus not only aids comprehension but also helps students appreciate the subject's significance in their lives.

Students often find that engaging in interactive and experiential learning enhances their understanding and retention of concepts. The enjoyment derived from these activities further motivates students to actively participate in their education. Some of the students from the experimental group found KETA to be highly effective in enhancing their understanding of Chemistry, particularly through hands-on experiments at each station under the active experimentation stage. These activities allowed students to manipulate materials and visualize key concepts, making the lessons more engaging and easier to comprehend. The students emphasized the importance of Chemistry in their lives and expressed a clear preference for interactive learning experiences, such as hands-on activities at stations, which helped them grasp the subject more effectively. They also highlighted that focusing on applying prior knowledge to new experiences fueled their motivation to learn more.

This is parallel to the study of Sibomana et al. (2021), who pointed out that students must be given the chance to engage in a hands-on approach since it is meant to help them learn in a meaningful way, teach them awareness and purpose, and acquire the necessary skills to perform their roles in social development.

Recognizes Challenges in Learning

Students have varying perspectives and abilities, which can impact their understanding of and interest in the subject. They face diverse experiences and challenges in learning Chemistry, such as finding some of the activities hard and confusing, struggling to express thoughts, and having uncooperative teammates. These obstacles hindered student engagement and understanding.

When random selected experimental group of students were asked about the problems or challenges, they encountered during the implementation of Kolb Experiential Teaching Approach (KETA), they said that some of the activities were difficult and confusing because they were unsure of how to proceed. They did not fully comprehend the instructions. They emphasized that although she had thoughts, she was unable to put them into words. Additionally, there were times when some of their groupmates were less cooperative, which made certain activities more difficult. This is consistent with the study of Chiu (2019), which showed that some students developed feelings of loneliness and helplessness in the whole activity because they could not obtain any help from their classmates.

Moreover, as the activity progressed during the intervention, the classroom became chaotic and disorderly, which led to the other students being noisy and restless. Because they are too pleased and thrilled, the students eventually destroy things, spill materials on the floor, and do not obey the rules during the exercises. This is aligned with the field notes of the researcher, which indicate that students were too joyful and enthusiastic to participate in the activities. The atmosphere became chaotic as students overwhelmed the stations, disrupting the classroom's order, breaking materials, causing objects to fall, and not following instructions.

CONCLUSION

Based on the findings, the Kolb Experiential Teaching Approach (KETA) using the Kolb Experiential Learning Cycle as a medium of instruction in teaching Chemistry significantly increased the academic performance and motivation of the experimental group compared to the Conventional Teaching Approach. In addition, there was a significant difference between the control and experimental groups' academic performance test mean scores after the intervention. In addition, there was a significant difference between the control and experimental groups' motivation after the intervention.

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