Using Gibb's Reflective Model Approach for Enhancing Project-Based Learning Among Students Through Reflective Assessment

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***Abstract*— Project-Based Learning (PBL) can be greatly improved when students use reflective assessment to think deeply about their experiences and build important skills. This paper focuses on using Gibbs' Reflective Cycle as a simple and organized way to help students reflect on their projects. The cycle has six steps—Description, Feelings, Evaluation, Analysis, Conclusion, and Action Plan—that guide students in understanding their work, learning from it, and planning for future improvement. In the Description step, students explain what they did during their project, including their tasks, roles, and the tools they used. The Feelings step allows them to share how they felt during the project, helping them understand their engagement and motivation. In the Evaluation step, students look at what went well and what didn't, identifying their successes and challenges. The Analysis step helps them think more deeply about why things happened the way they did and what influenced the results. The Conclusion step is where students figure out the key lessons they've learned and how they've grown personally and professionally. Finally, in the Action Plan step, they set specific goals and come up with ways to use what they've learned in their next projects. By following this process, the study shows that the students do better academically and also improve their thinking, problem-solving, and teamwork skills, which are essential for success.**

***Keywords*— Project-Based Learning, Reflective Assessment, Gibbs' Reflective Cycle, Student Learning, Critical Thinking, Educational Strategies, Experiential Learning, Self-Reflection**

ICTIEE* Track*: Assessment Effective Teaching
ICTIEE Sub-Track: Assessment for Learning: Empowering Students through effective Assessment Practices

I. INTRODUCTION

Reflective assessment plays an important role in the classroom because it helps students learn better by encouraging them to think about how they learn. When students take time to reflect, they look closely at their own thinking and learning habits. This helps them understand what works best for them, what they're good at, and what areas they need to improve. For example, a student might realize they learn well through pictures and diagrams but have difficulty following spoken instructions. Knowing this, they can start using more visual tools or ask for written notes to help them in class. Teachers can also use what students share in their reflections to give better support. For instance, a teacher might offer extra resources to a student struggling with a topic or give more advanced activities to one who has already mastered it. This way, every student gets the help they need to succeed, creating a more supportive and effective learning environment. Reflective assessment also encourages students to keep improving. By regularly reflecting on their progress and getting feedback, they develop a mindset where they see learning as a journey, not just a list of tasks to finish. This helps them set small, achievable goals, stick with challenges, and keep working to get better over time.

Project-Based Learning (PBL) is a teaching approach where students explore real-world problems and challenges, helping them understand concepts deeply and apply their knowledge in practical ways. Instead of traditional teacher-led lessons, PBL focuses on student-centered activities, where learners actively engage in projects that involve critical thinking, teamwork, and problem-solving. While PBL offers many benefits, its success depends on how well students' learning is assessed and supported. Reflective assessment is a valuable tool in PBL because it encourages students to think critically about their learning experiences. By reflecting on what they've done, students can better understand their learning process, identify areas to improve, and come up with strategies for future projects. This practice not only builds self-awareness and self-control but also helps students connect what they've learned in theory to real-world applications. Using Gibbs' Reflective Cycle in PBL adds even more value. This structured six-step reflection process helps students break down their experiences and draw meaningful lessons from them. It also encourages continuous improvement, where students learn from past projects and apply their knowledge to new challenges.

This paper looks at how Gibbs' Reflective Cycle can improve PBL through reflective assessment. By guiding students through the six steps of reflection, teachers can help them learn more deeply, solve problems more effectively, and prepare for real-world challenges. The paper will cover how to use this method, its benefits, and any challenges that might come up, as

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well as practical recommendations for making it work. By adding reflection to PBL, teachers can transform it into a powerful way to help students grow not just academically but also personally. This approach helps students become more self-aware, adaptable, and capable, equipping them to face the complexities of today's world.

II. LITERATURE SURVEY

Reflective assessment represents a paradigm shift in educational practices, moving beyond traditional measures of knowledge acquisition to encompass deeper processes of learning and self-awareness [1]. Rooted in the principles of metacognition, reflective assessment encourages students to critically examine their own learning experiences, understand their cognitive strategies, and make informed decisions about their learning paths [2]. This approach not only enhances academic performance but also fosters lifelong learning skills essential for success in an increasingly complex and dynamic world [3]. Central to effective reflective assessment is the integration of self-reflection and feedback mechanisms within classroom environments. Self-reflection prompts students to engage in introspective exercises where they evaluate their learning progress, identify areas of strength, pinpoint challenges encountered, and strategize ways to improve [4]. By systematically engaging in self-reflection, students develop metacognitive skills that enable them to monitor their own thinking, regulate their learning behaviors, and adapt their strategies based on feedback received [5].

Feedback, on the other hand, plays a complementary role by providing external perspectives and evaluative insights that validate or challenge students' self-assessments [6]. When delivered constructively and in a timely manner, feedback enhances the effectiveness of self-reflection by guiding students towards deeper insights, correcting misconceptions, and reinforcing positive learning behaviors [7]. Despite the theoretical underpinnings supporting reflective assessment, its implementation in classrooms varies widely. Challenges such as time constraints, varying levels of student readiness for self-reflection, and Teachers' familiarity with effective feedback strategies often hinder its full integration into educational practices [8]. Therefore, there is a critical need for empirical research that not only explores the impact of self-reflection and feedback on student learning outcomes but also identifies best practices and practical strategies for overcoming implementation barriers.

Recent studies highlight the benefits of integrating reflective assessment practices in higher education. The research by authors [9] explores how incorporating structured self-reflection activities into coursework enhances students' ability to critically analyze their learning processes and apply insights to future academic endeavors. This approach not only improves student engagement but also fosters deeper understanding and metacognitive development.

Studies by authors in [10] emphasize the crucial role of feedback in supporting effective reflective assessment practices. Their research demonstrates that timely and constructive feedback enhances students' self-reflection by providing them with actionable insights into their learning progress and areas for improvement. By incorporating feedback loops into reflective assessment strategies, Teachers can optimize student learning outcomes and promote continuous growth. Advances in educational technology have facilitated the development of innovative tools for enhancing reflective assessment. The authors in [11] evaluate the efficacy of digital platforms such as Socrative and Padlet in promoting self-reflection and peer feedback among secondary school students. Findings indicate that these tools not only streamline the process of collecting reflective data but also empower students to engage more deeply in metacognitive processes.

Research by [12] explores cultural factors influencing the implementation of reflective assessment practices in diverse educational contexts. Their study underscores the importance of considering cultural norms, values, and beliefs when designing reflective assessment strategies to ensure inclusivity and effectiveness. By acknowledging and respecting cultural diversity, Teachers can create more equitable learning environments that support all students in developing metacognitive skills through self-reflection and feedback. Effective implementation of reflective assessment requires ongoing professional development for Teachers. Recent literature by [13] discusses the impact of targeted professional learning communities and workshops on enhancing Teachers' capacity to integrate self-reflection and feedback into their teaching practices. By equipping Teachers with the necessary knowledge and skills, institutions can foster a culture of reflective practice that benefits both students and teachers alike.

This study seeks to address these gaps by investigating how structured self-reflection activities and feedback mechanisms can be effectively integrated into classroom settings to enhance reflective assessment practices. By identifying effective strategies and practical recommendations for implementing reflective assessment through self-reflection and feedback, this research aims to contribute to the ongoing discourse on innovative educational practices that empower students to become self-directed learners equipped for lifelong success.

A. The Gibbs' reflective cycle [14]

The Gibbs' Reflective Cycle is a theoretical model introduced by Graham Gibbs in 1988 to provide a structured framework for reflecting on experiences. It is widely used in education and professional development to help individuals systematically think about the phases of an experience or activity. The cycle consists of six stages:

1. Description: In this stage, the individual describes the experience in detail without making any judgments. This includes what happened, who was involved, what they did, and the outcome of the situation. The goal is to provide a clear and objective account of the event.

2. Feelings: This stage involves reflecting on and expressing the feelings and thoughts that were experienced during the event. It includes considering how one felt before, during, and after the experience. Understanding these emotions is crucial for gaining insights into the personal impact of the event.

3. Evaluation: Here, the individual evaluates the experience,

considering what was good and bad about the situation. This includes reflecting on what went well, what did not go as planned, and the reasons behind these outcomes. Evaluation helps in identifying the strengths and weaknesses of the experience.

4. *Analysis:* In the analysis stage, the individual delves deeper into understanding why things happened the way they did. This involves examining the causes and effects, considering different perspectives, and linking the experience to theoretical concepts or previous knowledge. The goal is to gain a deeper understanding of the experience and its implications.

5. *Conclusion:* This stage involves drawing conclusions from experience. It includes reflecting on what one has learned from the event, what could have been done differently, and how the situation might have been improved. Conclusions help in summarizing the key takeaways and lessons learned.

6. *Action Plan:* The final stage involves creating an action plan for future situations based on the reflections. This includes outlining steps to improve future performance, setting goals, and identifying specific actions to take if a similar situation arises again.

By following these six stages, Gibbs' Reflective Cycle provides a systematic approach to reflection, enabling individuals to learn from their experiences and apply this learning to future situations.

Fig. 1. The Gibb's reflective Cycle

III. METHODOLOGY

A. Integrating Gibbs' Reflective Cycle into Project-Based Learning (PBL) involves a structured approach that guides students through the stages of reflection as they work on their projects. This process ensures that students not only engage in hands-on activities but also critically reflect on their experiences to derive meaningful learning outcomes. The following steps outline the integration process.

The table outlines a structured approach to integrating Gibbs' Reflective Cycle into PBL for a computer network course. This integration aims to enhance students' reflective practices, deepen their understanding of computer networking concepts, and improve their overall learning experience.

A. Preparation and Orientation

- *Faculty Training:* The first step involves equipping Teachers with the necessary skills to facilitate reflective assessment using Gibbs' Reflective Cycle. Workshops and training sessions focused on the application of Gibbs' Cycle in PBL, specifically tailored to computer networking, ensure Teachers are well-prepared. Resources, templates, and examples are provided to support their implementation efforts.

- *Student Orientation:* Students are introduced to the concept of reflective assessment and the stages of Gibbs' Reflective Cycle. Orientation sessions highlight the importance of reflection in PBL, using engaging methods such as interactive presentations and discussions. This helps students understand how reflection can enhance their learning in computer networking.

B. Designing the Mini Project

- *Project Planning:* To implement Gibbs' Reflective Cycle effectively, specific topics in the computer networks course were chosen to provide hands-on learning opportunities. These topics were carefully selected to align with real-world applications, ensuring students could connect theoretical knowledge with practical tasks. The key topics included:
  a. ***Designing a Campus network:*** Students worked on creating a simple campus network for the authors college. They were tasked with deciding the network layout, selecting appropriate hardware (like routers and switches), and planning IP address assignments. This activity helped them understand network design principles and the challenges involved in setting up a functional network.
  b. ***Troubleshooting Network Issues:*** In this activity, students encountered simulated network problems, such as slow connectivity, device misconfigurations, or unauthorized access attempts. They used troubleshooting tools and logical reasoning to identify and fix these issues. This helped them improve problem-solving skills and apply their knowledge in practical scenarios.
- *Embedding Reflection Points:* Key milestones and phases within the project are identified as reflection points. Reflection sessions are scheduled after major tasks, presentations, or challenges, ensuring that students have structured opportunities to pause and reflect on their experiences. After designing the network layout, students reflected on the planning process, challenges faced, and whether their solutions were efficient. After configuring network security,

they evaluated the effectiveness of their security measures and considered potential improvements. Post troubleshooting, they analyzed the root causes of the issues they resolved, what strategies worked, and what could be done differently next time.

C. Implementation of Reflective Assessment

Gibbs' Reflective Cycle comprises six stages, each facilitating a different aspect of reflection:

- *Stage 1: Description:* Students describe the details of their mini project experience. Activities such as maintaining logs and writing narratives help them articulate what happened during the project.
- *Stage 2: Feelings:* Students express their emotional responses to the project experience through journaling exercises and discussion circles. This stage focuses on how they felt during various stages of the project.
- *Stage 3: Evaluation:* Students evaluate the positives and negatives of their experience by creating pros and cons lists and engaging in peer feedback. This stage helps them assess what worked well and what didn't.
- *Stage 4: Analysis*: Students make sense of their experience by conducting root cause analysis and concept mapping. This stage helps them understand why certain outcomes occurred.
- *Stage 5: Conclusion:* Students draw conclusions about their learning and project experience by writing reflection essays and learning statements. They summarize key lessons learned from the project.

TABLE I
INTEGRATION PROCESS

Step	Objective	Activities	Questions
1. Preparation and Orientation			
Faculty Training	Equip Teachers with skills for reflective assessment using Gibbs' Cycle.	• Workshops on Gibbs' Cycle in PBL. • Provide resources and examples.	• How can Gibbs' Cycle be effectively implemented?
Student Orientation	Introduce students to reflective assessment and Gibbs' Cycle.	• Orientation sessions with examples from networking. • Interactive presentations and discussions.	• Why is reflection important in PBL?
2. Designing the Mini Project			
Project Planning	Design projects aligning with curriculum goals and reflection opportunities.	• Develop project outlines with objectives and tasks. • Include real-world networking scenarios.	• What are the objectives and outcomes?
Embedding Reflection Points	Integrate reflection points throughout the project.	• Identify key milestones for reflection. • Schedule reflection sessions after tasks.	• When should reflection occur?
3. Implementation of Reflective Assessment			
Stage 1: Description	Help students recount their project experience.	• Maintain logs and write narratives.	• What was the project about?
Stage 2: Feelings	Articulate emotional responses to the project.	• Journaling exercises and discussion circles.	• How did you feel during the project?
Stage 3: Evaluation	Evaluate the positives and negatives of the experience.	• Create pros and cons lists, peer feedback.	• What were the successes and challenges?
Stage 4: Analysis	Make sense of the experience and outcomes.	• Root cause analysis and concept mapping.	• Why did certain outcomes occur?
Stage 5: Conclusion	Draw conclusions about learning and experience.	• Reflection essays and learning statements.	• What have you learned?
Stage 6: Action Plan	Develop a plan for applying learning to future projects.	• Set SMART goals and action plans.	• What will you do differently next time?
4. Ongoing Support and Feedback			
Continuous Feedback	Provide ongoing support and feedback.	• Review reflections and offer feedback.	• How can feedback support reflection?
Teacher Support	Ensure Teachers have necessary support.	• Provide resources and regular check-ins.	• What support do Teachers need?
5. Evaluation and Review			
Formative Evaluation	Continuously evaluate the reflective process.	• Collect and analyze reflections and feedback.	• How effective is the process?
Summative Evaluation	Assess the overall impact on learning outcomes.	• Compare performance metrics and feedback.	• What is the overall impact on learning?

• *Stage 6: Action Plan:* Students develop a plan for applying their learning to future projects by setting SMART goals and creating detailed action plans. This stage helps them prepare for future challenges and opportunities.

D. Ongoing Support and Feedback

- *Continuous Feedback:* Ongoing support and feedback are crucial throughout the mini project. Teachers

regularly review students' reflections, offer constructive feedback, and encourage peer feedback to enhance the reflective process.

- *Teacher Support:* Ensuring Teachers have the necessary support is vital for the successful facilitation of reflective assessment. Providing resources, holding regular check-ins, and creating a support network for Teachers help them share best practices and address challenges.

E. Evaluation and Review

- *Formative Evaluation:* The effectiveness of the reflective assessment process is continuously evaluated by collecting and analyzing students' reflective journals, essays, and action plans. Surveys and questionnaires gather feedback from students and Teachers.

- *Summative Evaluation:* The overall impact of reflective assessment on students' learning outcomes is assessed by comparing pre- and post-project performance metrics, conducting final reflection reviews, and analyzing Teacher feedback.

- *Technology Integration:* Technology is utilized to facilitate the reflective process. Online platforms and tools are used for students to document their reflections, share feedback, and collaborate on projects. Software tools for network simulation and analysis enhance practical learning.

By following this structured approach, the integration of Gibbs' Reflective Cycle into PBL for a mini project in a computer network course ensures that students engage in meaningful reflection, leading to improved learning outcomes and a deeper understanding of computer networking concepts.

IV. FINDINGS AND DISCUSSIONS

The survey aimed to assess perceptions and experiences related to the implementation of Gibbs' Reflective Cycle in project-based learning (PBL) settings. It consisted of structured questions divided into five main sections: Preparation and Orientation, Designing the Mini Project, Implementation of Reflective Assessment, Ongoing Support and Feedback, and Evaluation and Review. The survey included both quantitative scales (e.g., 1-5 Likert scales) and qualitative responses (e.g., open-ended questions) to gather comprehensive feedback.

Participants were both teachers and students involved in PBL activities related to computer networking concepts. The survey was administered electronically via an online platform over a two-week period. Participants were informed about the purpose of the survey, and their responses were anonymized to ensure confidentiality.

Quantitative data from Likert scale questions were analyzed using descriptive statistics, such as frequencies and percentages, to summarize participant perceptions. Open-ended responses were subjected to thematic analysis to identify recurring themes and qualitative insights. Findings from both quantitative and qualitative analyses were integrated to provide a comprehensive understanding of participant feedback.

A. Preparation and Orientation

- *Teacher Training:* Most Teachers reported feeling moderately confident (average rating of 3.8 on a 1-5 scale) in implementing Gibbs' Reflective Cycle in PBL settings. The training sessions were rated as effective, with an average score of 4.2, indicating that most Teachers felt well-prepared. However, some Teachers highlighted the need for additional resources and support, particularly practical examples and ongoing mentoring, to effectively implement reflective assessment. Open-ended responses suggested that while the training provided relevant examples, there was a need for more context-specific scenarios. Teachers recommended improvements in areas such as the depth of content covered and the provision of follow-up workshops.
- *Student Orientation:* Students generally understood Gibbs' Reflective Cycle well after orientation, with an average rating of 4.1. The clarity of explanations regarding the importance of reflection in learning was also rated high (4.3), indicating effective communication. Engagement during orientation sessions received a slightly lower score of 3.9, suggesting room for improvement in making sessions more interactive. Most students (85%) felt prepared to use Gibbs' Reflective Cycle in their projects. However, suggestions for improving orientation included incorporating more hands-on activities and real-world examples to make the sessions more engaging and practical.

B. Designing the Mini Project

- *Project Plans Review:* Participants found the objectives of their mini projects to be clear, with an average rating of 4.2. The relevance of tasks to real-world scenarios was rated at 4.0, showing a strong connection between project activities and practical applications. Timelines and expected outcomes were generally well-defined (4.1), and project tasks were considered achievable (4.0). Suggestions for improvement focused on providing more detailed timelines and clearer descriptions of expected outcomes. Open-ended responses indicated a desire for more diverse and complex real-world scenarios to enhance the learning experience.

- *Student Feedback:* Students rated the engagement level of project tasks at 4.0, indicating that the tasks were interesting and engaging. The tasks also helped students better understand computer networking concepts, with an average rating of 4.1. The relevance of real-world scenarios to learning was rated at 4.0, with most students (78%) expressing a desire for more real-world scenarios to be included in future projects. Open-ended responses highlighted the need for projects that cover a

broader range of scenarios, including emerging technologies and more complex networking challenges.

C. *Implementation of Reflective Assessment*

- *Reflective Journal:* Reflections in journal entries were rated as comprehensive (3.9), indicating that students engaged deeply with the reflective process. Reflective journaling helped students understand their project experiences better, with an average rating of 4.1. Students updated their journals mainly on a weekly basis, but some reported doing so after major tasks. Challenges in maintaining reflective journals included time management and the perceived repetitiveness of entries. Suggestions for improvement involved providing more guided prompts and examples to help students reflect more effectively.

TABLE II
FINDINGS FROM QUALITATIVE & QUANTITATIVE ANALYSIS

	Questions	Type
1. Preparation and Orientation		
Teacher Training	How confident do you feel in implementing Gibbs' Reflective Cycle in PBL?	1-5
	How effective were the training sessions in preparing you for using Gibbs' Reflective Cycle?	1-5
	How would you rate the relevance of the examples provided during training?	1-5
	What specific areas of the training could be improved?	Open-ended
Student Orientation	How well do you understand Gibbs' Reflective Cycle after the orientation?	1-5
	How clear were the explanations about the importance of reflection in learning?	1-5
	How engaging were the orientation sessions?	1-5
	Do you feel prepared to use Gibbs' Reflective Cycle in your projects?	Yes/No
	What suggestions do you have for improving the student orientation?	Open-ended
2. Designing the Mini Project		
Project Plans Review	How clear were the objectives of your mini project?	1-5
	How relevant were the tasks to the real-world scenarios?	1-5
	Were the timelines and expected outcomes clearly defined?	1-5
	How achievable did you find the project tasks?	1-5
	What improvements would you suggest for the project plans?	Open-ended
Student Feedback	How engaging did you find the project tasks?	1-5
	Did the project tasks help you understand computer networking concepts better?	1-5
	How relevant were the real-world scenarios to your learning?	1-5
	Do you think more real-world scenarios should be included in the project?	Yes/No
	What other scenarios would you like to see included in future projects?	Open-ended
3. Implementation of Reflective Assessment		
Reflective Journals	How comprehensive were your reflections in your journal entries?	1-5
	Did the reflective journaling help you understand your project experiences better?	1-5
	How often did you update your reflective journal?	Weekly
	What challenges did you face in maintaining your reflective journal?	Open-ended
	How can the process of reflective journaling be improved?	Open-ended
Emotional Articulation	How comfortable were you in expressing your emotions during the reflection process?	1-5
	How did articulating your feelings affect your learning?	1-5
	Did you feel that discussing your emotions helped you understand your experiences better?	Yes/No
	How supportive was the environment in allowing you to express your emotions?	1-5
	What could be done to make the emotional articulation process better?	Open-ended
Evaluation and Analysis	How balanced do you think your evaluations of the project experiences were?	1-5
	Did you feel you could identify the root causes of your challenges and successes?	1-5
	How useful were the evaluation exercises (e.g., pros and cons lists, peer feedback)?	1-5
	How could the evaluation and analysis phase be improved?	Open-ended
	What additional tools or methods would help you in evaluating and analyzing your project experiences?	Open-ended
Conclusion and Action Plans	How clear and relevant were the lessons you learned from the project?	1-5
	How practical and specific was your action plan for future projects?	1-5
	How confident are you that you will apply the lessons learned to future projects?	1-5
	How helpful was the process of writing reflection essays and learning statements?	1-5
	What suggestions do you have for improving the conclusion and action planning phase?	Open-ended
4. Ongoing Support and Feedback		
Feedback Logs	How often did you receive feedback on your reflections?	Bi-weekly
	How useful was the feedback in refining your reflections?	1-5
	How timely was the feedback you received?	1-5
	What was the quality of the feedback provided?	1-5
	What could be done to improve the feedback process?	Open-ended
Teacher Support	How adequate was the support you received for implementing Gibbs' Reflective Cycle?	1-5
	How effective was the support network in addressing your challenges?	1-5
	What additional support do you think is necessary?	Open-ended
	How frequently did you participate in support network meetings or check-ins?	Bi-weekly
	What best practices did you find most helpful from the support network?	Open-ended
5. Evaluation and Review		
Formative Assessment	How much did your understanding and skills improve after the project?	1-5
	How effective do you think the reflective assessment process was in improving your learning?	1-5
	How useful were the pre- and post-project assessments in measuring your progress?	1-5
	What aspects of the formative assessment process could be improved?	Open-ended

Summative Evaluation	How motivated were you to engage in reflective practices?	1-5
	How beneficial was the reflective process for your overall learning experience?	1-5
	What aspects of Gibbs' Reflective Cycle were most beneficial to your learning?	Open-ended
	How effective was the reflective assessment in helping you achieve the project outcomes?	1-5
	How likely are you to use reflective practices in future projects?	1-5
	What suggestions do you have for improving the reflective assessment process?	Open-ended
Technology Utilization	How effectively did you use technology for reflective practices?	1-5
	What challenges did you face in using the online platforms and tools?	Open-ended
	How user-friendly were the technological tools provided for reflective assessment?	1-5
	How often did you use online platforms for documenting and sharing reflections?	Weekly
	What additional features or tools would improve the technology used for reflective assessment?	Open-ended

- *Emotional Articulation:* Students felt moderately comfortable expressing their emotions during the reflection process, with an average rating of 3.8. Articulating feelings positively affected learning (4.0), and most students (70%) felt that discussing emotions helped them understand their experiences better. The supportive environment received a rating of 4.1, indicating that students felt encouraged to express their emotions. To improve emotional articulation, students suggested more structured opportunities for emotional expression and additional support from Teachers in navigating emotional reflections.

- *Evaluation and Analysis:* Participants believed their evaluations of project experiences were balanced, with an average rating of 4.0. Identifying root causes of challenges and successes was rated at 4.1, indicating that reflective activities were effective in fostering analytical skills. The usefulness of evaluation exercises, such as pros and cons list and peer feedback, received a score of 4.2. Suggestions for improvement included integrating more diverse evaluation tools and methods, such as case studies and scenario-based analyses, to deepen the evaluation process.

D. Ongoing Support and Feedback

- *Feedback Logs:* Feedback on reflections was typically received bi-weekly by the majority of participants, which was deemed useful in refining their reflections (4.2). The timeliness of feedback was rated at 4.0, and the quality of feedback provided received a rating of 4.1. Open-ended responses highlighted the importance of timely and constructive feedback in enhancing the reflective process. Improvements suggested for the feedback process included more frequent and detailed feedback, as well as incorporating peer feedback sessions to provide diverse perspectives.

- *Teacher Support:* Teachers rated the adequacy of support received for implementing Gibbs' Reflective Cycle at 4.0. The effectiveness of the support network in addressing challenges was rated similarly at 4.0. However, additional support was deemed necessary, particularly in the form of continuous professional development and access to a wider range of resources. Participation in support network meetings or check-ins was typically monthly. Best practices found most helpful included collaborative workshops and sharing of success stories among peers.

E. Evaluation and Review

- *Formative Assessment:* Participants reported significant improvement in understanding and skills after the project, with an average rating of 4.1. The reflective assessment process was deemed effective in improving learning (4.0), and pre- and post-project assessments were useful in measuring progress (4.1). Motivational levels to engage in reflective practices were moderately high (3.9). Areas for improvement in formative assessment included more frequent check-ins and personalized feedback to maintain engagement and motivation throughout the project.

- *Summative Evaluation:* The reflective process was beneficial for the overall learning experience, receiving an average rating of 4.2. Aspects of Gibbs' Reflective Cycle that were most beneficial included the structured approach to reflection and the emphasis on emotional articulation. The effectiveness of reflective assessment in achieving project outcomes was rated at 4.1, with a high likelihood of participants using reflective practices in future projects (4.2). Suggestions for improving the reflective assessment process included more tailored reflective prompts and enhanced integration of technology to streamline reflection documentation.
- *Technology Utilization:* Participants rated the effectiveness of technology use for reflective practices at 4.0. Challenges faced included technical issues and the learning curve associated with new tools. The user-friendliness of technological tools provided for reflective assessment received an average rating of 3.9. Online platforms for documenting and sharing reflections were typically used weekly. Additional features or tools suggested included more intuitive interfaces, integrated feedback mechanisms, and enhanced mobile accessibility to facilitate easier documentation and sharing of reflections.

Discussion: The survey findings show that both teachers and students generally found the use of Gibbs' Reflective Cycle in PBL settings to be effective and valuable. Training and orientation sessions were well-received, but there was clear feedback about the need for more interactive and practical examples to make the sessions more engaging and relevant. Suggestions included using relatable, real-world scenarios, like

setting up a business network or troubleshooting common issues, as well as incorporating hands-on tools like Cisco Packet Tracer or Wireshark. Project design was praised for its clarity and relevance, but many felt that including more diverse and challenging real-world scenarios could make the learning experience even richer. Reflective journaling and emotional articulation helped deepen students' understanding of their experiences, but additional guidance and structured opportunities to explore emotions were highlighted as areas for improvement. Feedback processes were useful overall, but more frequent and detailed feedback could further support the reflective process. Teachers found support networks helpful but expressed a need for ongoing professional development and better access to resources. Formative and summative assessments demonstrated the positive impact of reflective practices on learning, with technology playing a significant role. However, many felt that technological tools could be improved to make documenting and sharing reflections easier and more user-friendly. These insights emphasize that while Gibbs' Reflective Cycle is a powerful framework, its implementation can be improved with more engaging training, tailored project tasks, structured emotional support, and better technology. These refinements would help optimize the reflective process and make it even more impactful for students and teachers alike.

CONCLUSION

The survey results show that using Gibbs' Reflective Cycle in project-based learning (PBL) helps both teachers and students improve their learning. Participants liked the clear and relevant project tasks and felt supported when expressing their emotions. However, there are a few areas to improve. Teachers and students suggested making training sessions more engaging by including interactive and real-world examples. This would help them understand and use reflective practices better. While feedback was generally helpful, participants wanted more frequent and detailed feedback to keep improving their reflections. Technology was useful, but some found it hard to use. They suggested making the tools easier to use and more accessible on mobile devices to make it simpler to document and share reflections. By focusing on these improvements, schools can make reflective assessment even more effective, leading to a better learning experience for everyone. These findings offer valuable insights for making future educational assessments better, highlighting the need for ongoing improvements to meet the needs of teachers and students.

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