JOURNAL OF APPLIED SCIENCES TECHNOLOGY AND COMPUTING
e-ISSN: 3036-0250

JASTEC

Vol. 2 No. 2 (2026) 19-28
https://publisher.uthm.edu.my/ojs/index.php/jastec

# Collaborative Question and Answer for Student-Centered Academic Support in Malaysian Universities

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DOI: https://doi.org/10.30880/jastec.2025.02.02.003

**Article Info**

Received: 18 July 2025
Accepted: 24 November 2025
Available online: 31 December 2025

**Keywords**

Collaborative learning, peer support, question-and-answer systems, higher education, artificial intelligence in education, Malaysia

**Abstract**

Success in higher education, especially within institutions offering diverse programs and experiencing increasing student populations, depends on effective academic support. Traditional methods, such as lecturer consultations and peer interactions via messaging platforms, often face limitations in scalability, knowledge management, and accessibility. Collaborative Question-and-Answer (Q&A) systems have emerged as a technology-driven approach to address these challenges, providing scalable peer learning, reducing lecturer workload, and creating structured repositories of academic knowledge. This review paper explores the current landscape of collaborative Q&A systems in higher education, highlighting their contributions to student engagement, critical thinking, and self-regulated learning. Furthermore, it identifies key design considerations and research gaps that must be addressed to establish a sustainable, student-centered academic support ecosystem.

## 1. Introduction

Effective academic support is a basis of student success in higher education. As universities expand their programs and student populations become more diverse, meeting individual learning needs becomes increasingly challenging [1]. The surge in enrolment increases the demand for timely guidance, placing additional pressure on lecturers, tutors, and academic staff. First-year students are particularly affected, as they often need clarification as they adjust to new academic expectations [2].

Students in higher education frequently encounter complex academic content, unfamiliar learning formats, and increased expectations for independent study. Many concepts require clarification, and students benefit from personalized guidance to understand course materials, assignments, and assessment criteria. Direct interaction with lecturers, tutors, or academic staff enables students to ask questions, receive feedback, and gain deeper insight into subject matter. These interactions also help students develop critical thinking, problem-solving skills, and academic confidence. All of these are competencies essential for success in a rigorous academic environment.

Traditionally, students access academic support by consulting with lecturers during office hours, participating in tutorials or communicating via email. While these approaches can provide individual guidance, they are often inefficient, especially in institutions with large and diverse student populations. Answering similar questions repeatedly not only slows down responses but also increases lecturer workload, limiting the time available for research, curriculum development and student guidance [3]. Furthermore, these conventional methods rarely

provide a centralized record of queries, making it difficult to identify recurring challenges or build a structured repository of knowledge for future cohorts. Such inefficiencies underscore the need for scalable and technology-driven solutions, such as collaborative Q&A systems, that can streamline information sharing, reduce redundancy, and improve academic support and teaching productivity.

To address these challenges, collaborative Question-and-Answer (Q&A) systems have emerged as practical and scalable solutions [4]. These platforms enable users to post, answer, categorize, and archive questions for future reference, thereby reducing information loss and facilitating peer-to-peer learning [5]. By distributing repetitive queries, lecturers can focus on higher-level academic tasks [6]. Collaborative Q&A systems also encourage active learning. Students act as both knowledge seekers and contributors, enhancing critical thinking, communication, and problem-solving skills [7]. Features such as reputation scoring, tagging, and keyword search improve credibility and information retrieval [8]. It provides a reliable, shared knowledge base accessible anytime, anywhere.

Traditionally, academic support beyond the classroom relies heavily on WhatsApp or Telegram groups and face-to-face consultations. These methods, however, lack organization and consistency. Important information often becomes buried in long chat threads, leading to repeated questions and frustration [9]. A collaborative Q&A platform could improve accessibility, streamline communication, and support cross-faculty collaboration. It could also serve as a long-term knowledge repository for future cohorts [10].

This review paper examines the potential of collaborative Q&A systems to strengthen academic support in higher education. Specifically, it synthesizes literature on digital learning platforms, peer-assisted support, and knowledge-management frameworks. This paper contributes to ongoing discussions on digital learning innovation, student-centered academic support, and scalable knowledge systems. The insights may guide similar institutions in designing structured, collaborative support platforms that improve student learning and success.

This paper is organized as follows: Section 1 provides an overview of the study background and objectives. Section 2 reviews existing collaborative Q&A systems and their key features. Section 3 discusses their role in enhancing peer collaboration and self-regulated learning. Section 4 presents peer collaboration, engagement, and adaptive learning in Q&A Systems. Section 5 discusses pedagogical foundations, including active learning, knowledge sharing, and future Directions. Section 6 concludes the review.

## 2. Literature Review on Collaborative Q&A Systems

Collaborative Q&A systems in higher education function as structured online spaces where learners ask and answer questions in a focused, task-oriented environment. Unlike general discussion boards, these systems emphasize help-seeking, knowledge sharing, and problem resolution [11]. Research indicates that active participation in Q&A forums positively impacts learning and performance. For instance, in large STEM courses, higher levels of interaction, both student–student and student–instructor, are linked to improved course outcomes [12].

It is important to build support around students in campus life. Information that supports life and learning on campus needs to be publicized or easily accessible. Therefore, student-centered academic support serves as a platform for managing and disseminating the information students need. This mechanism helps ease the burden on lecturers or student representatives who have to answer repeated questions. The collaborative Q&A approach enhances student-centered academic support by enabling students to ask questions when needed, engage in peer-to-peer knowledge exchange, and learn from multiple perspectives outside of formal classroom hours.

Unlike traditional time-bound, lecturer-dependent consultations, the collaborative Q&A system provides ongoing, scalable support while allowing students to control the timing, depth, and manner of their engagement. The collective generation and refinement of answers promotes critical thinking, self-directed learning, and academic confidence, while the accumulated Q&A archive serves as a shared knowledge resource for current and future cohorts. In the Malaysian context, this approach supports a large and diverse student population by extending academic support in an inclusive, flexible, and participatory manner, reinforcing the shift toward more active, student-driven educational practices.

Peer feedback is a central mechanism within collaborative Q&A platforms. Research in medical education demonstrates that peer evaluation during group learning enhances the quality of student work and boosts confidence, provided that appropriate scaffolding is in place to ensure high-quality feedback [13]. Similarly, in virtual learning environments, dialogic peer interaction has been shown to promote deeper learning when effectively implemented [14]. Technology-enhanced peer feedback further strengthens collaborative writing and critical thinking. One study found that using digital tools such as Google Docs for peer and teacher feedback led to higher engagement and greater critical thinking than self-feedback alone [15]. These findings align with broader evidence showing that online peer feedback increases motivation, self-efficacy, and confidence among higher education learners [16].

A further important dimension of Q&A system design is the quality of knowledge. Researchers have developed data-driven approaches to assess the reliability and usefulness of shared content. For example, one model uses

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automated metrics to evaluate the quality of answers in voice-based knowledge-sharing environments. It helps systems maintain high information standards [17]. Initiatives such as PeerCollab highlight the value of peer assessment in modernizing traditional learning and emphasizing student-centered pedagogies. It cultivates critical thinking, collaboration, and active engagement [18]. Concurrently, learning analytics and artificial intelligence (AI) are increasingly embedded into Q&A platforms, supporting automated feedback, reputation systems, and personalized learning pathways [19].

In classroom-based settings, peer-to-peer questioning plays a significant role in sustaining collaborative learning. Evidence shows that student-generated questions can initiate and maintain group dialogue, thereby contributing substantially to cognitive engagement [20]. Despite these benefits, several persistent challenges remain. Ensuring student motivation, maintaining moderation, and guaranteeing the accuracy and consistency of peer responses are ongoing issues that affect the scalability and reliability of collaborative Q&A systems [11][16]. Addressing these challenges is essential for these platforms to evolve into robust academic support tools within higher education.

When students ask questions together using a shared student-centred system, it can help them gain better information and support a better student life at university. However, its effectiveness depends on overcoming key environmental barriers. Some students lack stable online connections or comfort with technological tools. This affects the opportunity to access information. So, one way to overcome this is to build a tool that works well on phones and in slow internet zones while helping staff and students learn the basics of the technology. Another problem arises when peer answers vary greatly in reliability or usefulness. The dissemination of such results may undermine confidence in what students have learned. On the other hand, lecturers can be relieved of the burden of answering repeated student questions. Addressing each of these issues is important if this student question-and-answer system is to be sustainable and truly help students across universities in Malaysia.

## 3. Existing Collaborative Q&A Systems

Collaborative Q&A platforms have become increasingly relevant in higher education as institutions adopt scalable and interactive forms of academic support. These systems facilitate structured knowledge exchange among students, lecturers, and teaching assistants, thereby improving accessibility, engagement, and peer collaboration. Well-known platforms such as Piazza, Blackboard Q&A, Padlet, and Stack Overflow for Education demonstrate diverse approaches to supporting student-centered learning and digital knowledge management in academic environments.

Piazza is among the most widely adopted Q&A platforms worldwide, particularly in universities. It offers course-integrated discussion forums where students can post questions, collaboratively construct answers, and receive feedback from the instructor. Research shows that Piazza increases participation and reduces repetitive questions by providing access to earlier discussions, while its anonymity feature encourages engagement from students who may be hesitant to contribute to conventional classroom settings [21].

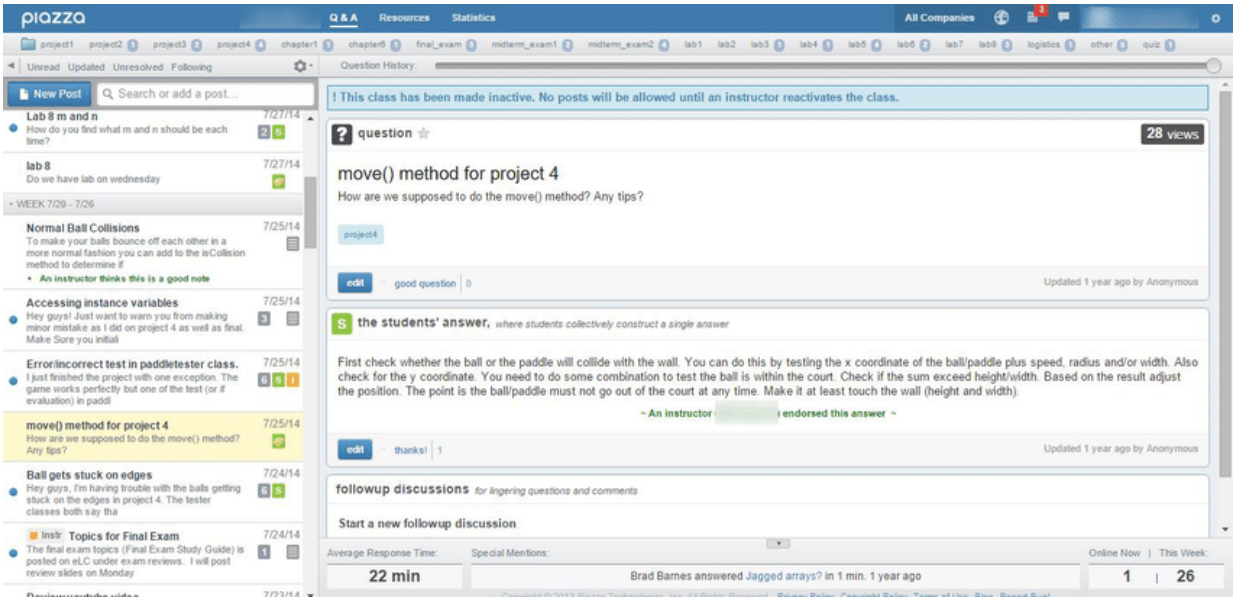


**Fig. 1** *Collaborative Q&A interface (Piazza platform)*

Figure 1 illustrates the Piazza interface, presenting how questions, collaboratively developed responses, and instructor endorsements are organized within a single thread. The transparent structure promotes collective problem-solving, as students can easily review past discussions and refine shared answers. Features such as tagging, follow-up threads, and optional anonymity enhance inclusivity and efficiency, particularly in large cohorts or online learning contexts.

Blackboard Q&A, integrated within the Blackboard Learning Management System (LMS), offers structured question threads directly linked to course modules. Its primary advantage lies in seamless integration with course materials, grading tools, and administrative features, enabling efficient management of academic interactions. However, adoption varies across institutions due to licensing costs and the complexity of configuration [22].

Padlet provides a more visual and flexible medium for collaborative inquiry. Although not specifically designed for Q&A activities, its interactive boards support the posting of questions, multimedia content, and peer responses. This flexibility encourages reflective and creative learning. Nevertheless, the absence of features such as systematic tagging and reputation scoring limits its use for long-term, structured knowledge curation [23]; [24].

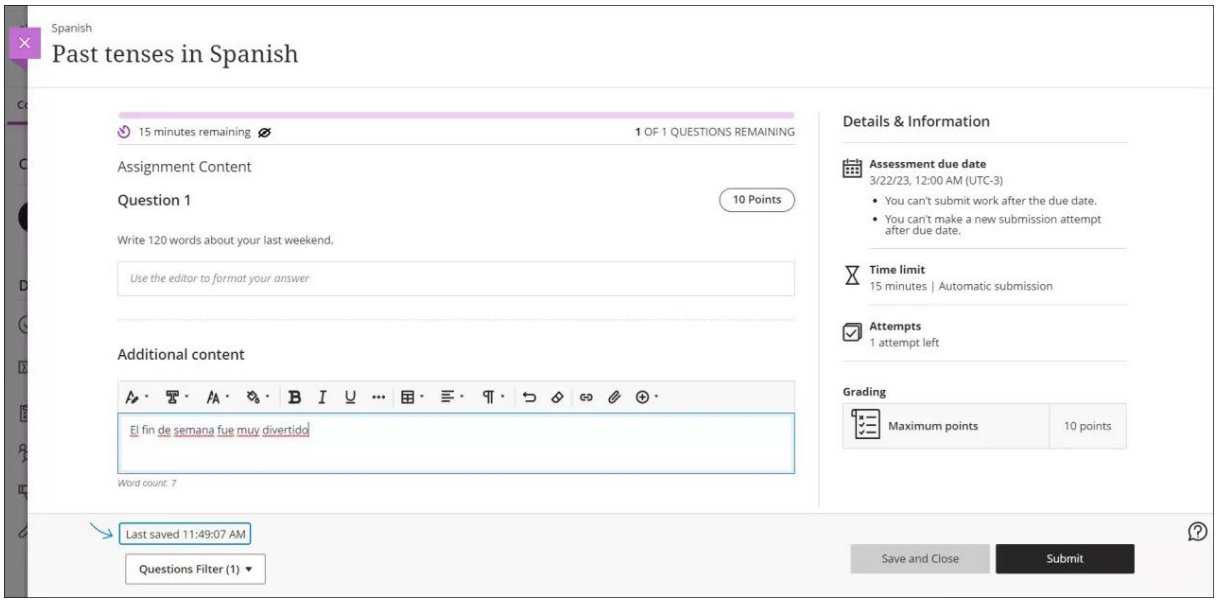


**Fig. 2** *Blackboard Q&A interface*

Figure 2 depicts the Blackboard Q&A interface embedded within the LMS. Question threads are aligned with course modules, allowing students to submit responses, instructors to assess contributions, and both groups to interact within a unified environment. Integrated tools such as grading functions, time controls, and submission logs streamline assessment processes and exemplify how LMS platforms can support structured academic discussion while retaining administrative oversight and pedagogical alignment.

Stack Overflow for Education, adapted from the professional developer platform, utilizes a highly structured and gamified model. Features such as tagging, reputation points, and upvoting help maintain content quality and reward active contributors, fostering motivation and accountability in computing and engineering disciplines [25]. However, its competitive culture may discourage novice learners, indicating the need for balanced participation strategies and mentoring mechanisms [26].

Across these platforms, common strengths and challenges are evident. All provide structured posting mechanisms, searchable archives, and community-driven interactions. Piazza and Blackboard Q&A are widely adopted in formal university courses. Whereas Padlet is more popular in blended and informal settings. Notable benefits include reduced lecturer workload through archived answers, faster response times, and enhanced collaboration. Persistent challenges include uneven participation, variable content quality, and the need for continuous moderation to maintain accuracy and academic integrity [27]; [28].

Empirical findings consistently demonstrate the educational value of participating in collaborative Q&A sessions. Research [29]; [27] indicates that peer engagement supports improved academic performance, enhances critical thinking, and strengthens self-regulated learning. Instructors also benefit from reduced redundancy when addressing frequently asked questions. Consequently, it allows for a greater focus on conceptual teaching and personalized guidance.

Overall, collaborative Q&A platforms have strong potential to transform academic support through structured information exchange and active peer learning. Their success, however, requires thoughtful implementation,

sustained moderation, and alignment with institutional goals. Insights from established systems provide a foundation for designing a customized Q&A platform that supports both student empowerment and teaching efficiency. The increasing adoption of such systems reflects a broader shift toward peer-driven, student-centered learning. Beyond technological functionalities, these platforms embody principles of collaboration, reflection, and self-regulation. Table 1 gives the comparative analysis of Collaborative Q&A studies and identifies research gaps.

**Table 1** *Comparative analysis of collaborative Q&A studies and identified research gaps*

| Study / Source | Country / Context | Platform / Focus | Methods | Key Findings | Limitations / Research Gaps |
|---|---|---|---|---|---|
| Students, systems, and interactions: Understanding engagement in course discussion forums [21] | Global / Higher education | Piazza-type Q&A forums | Mixed methods (log analytics and interviews) | • Visibility of shared posts reduces redundancy<br>• Anonymity promotes participation | • Focused mainly on computing courses<br>• Limited evidence from developing or non-English contexts, such as Malaysia |
| E-learning critical success factors: Comparing perspectives from academic staff and students [22] | Middle East / University LMS adoption | Blackboard Q&A / LMS discussion threads | Quantitative survey | • Identified training, usability, and integration as key success factors<br>• Lack of training hinders adoption | • General e-learning study, not Q&A-specific<br>• Lacks detailed analysis of peer interaction quality |
| Students' perceptions of using Padlet for collaborative learning in higher education [24] | Malaysia / Blended learning | Padlet – a visual collaborative tool | Quantitative and qualitative (survey & reflection) | • Enhanced collaboration and reflection<br>• Lacks structured organization and tagging | • Focused on short-term perception data<br>• Lacks long-term evaluation of learning impact |
| Gamified peer learning through Stack Overflow for Education [25] | Global / Computing education | Stack Overflow for Education – gamified peer Q&A | Usage data and participant interviews | • Reputation scoring and upvoting enhance quality and motivation<br>• Competitiveness may deter novices | • Study limited to technical disciplines<br>• Lacks insight into humanities or multidisciplinary contexts |
| Active learning increases student performance in science, engineering, and mathematics [29] | Global / STEM education | Active learning meta-analysis | Systematic review (225 studies) | • Active participation improves performance and reduces failure rates | • Limited focus on digital or asynchronous Q&A learning contexts |
| Peer learners' learning process and self-regulation in online learning [27] | Global / Online learning | Self-regulated and peer-assisted learning | Mixed methods | • Peer feedback improves self-regulation and sustained engagement | • Does not address platform design<br>• Focused on psychological learning aspects |

| | | | | | |
|---|---|---|---|---|---|
| Online peer discussion and collaborative learning in Malaysian higher education [26] | Malaysia / Public universities | Online peer discussion | Experimental study | • Peer discussion improves engagement<br>• Lecturer moderation ensures quality | • Conducted pre-pandemic<br>• Limited exploration of post-digital transition learning environments |
| Digital learning engagement and participation in Malaysian universities [30] | Malaysia / HEIs | Digital collaboration platforms | Mixed methods | • Found participation gaps and digital literacy issues among students | • Did not focus on Q&A platforms<br>• Limited exploration of AI-based personalization |
| Peer Instruction: A User's Manual [31] | Global / Pedagogical foundation | Peer instruction model | Conceptual | • Demonstrated that peer questioning promotes deeper understanding | • Conceptual<br>• Lacks empirical evaluation of digital peer instruction |
| Becoming a self-regulated learner: An overview [32] | Theoretical/global | Self-regulated learning framework | Conceptual | • Defines self-monitoring and goal-setting for learner autonomy | • Theoretical framework<br>• Needs contextual adaptation to modern digital environments |

Table 2 summarises and compares common collaborative Q&A platforms used in Malaysian universities. It includes the academic benefits, strengths, and limitations. The summary also highlights how different levels of structure and accessibility influence their effectiveness in supporting student learning and academic performance.

**Table 2** *Common collaborative Q&A platforms*

| Platform Type | Primary Academic Benefits | Key Strengths | Main Limitations |
|---|---|---|---|
| LMS Discussion Boards | Structured discussion; deeper conceptual understanding | Aligned with course outcomes; searchable content | Slow interaction; low engagement if not assessed |
| Dedicated Q&A Forums | Rapid peer support; collaborative problem-solving | Scalable; quality filtering; reduces lecturer workload | Requires moderation and user training |
| Messaging Groups | Immediate clarification; peer motivation | Highly accessible; familiar to students | Unstructured; poor knowledge retention |
| Hybrid Q&A Systems | Self-regulated and sustained learning | Combines accessibility and structure; scalable | Higher implementation effort |
| Face-to-Face Support | Personalised feedback | Effective for complex issues | Limited scalability |

## 4. Peer Collaboration, Engagement, and Adaptive Learning in Q&A Systems

Collaborative Q&A platforms in higher education support both peer-driven learning and personalized adaptive features. It creates a dynamic ecosystem that fosters engagement, self-regulation, and academic success. Grounded in Vygotsky's social constructivist theory [33], these systems enable students to co-construct knowledge through interaction, dialogue, and feedback [34]. It also features artificial intelligence, learning analytics, and gamification to tailor learning experiences to individual needs.

(a) Peer Collaboration and Self-Regulated Learning (SRL):
Q&A platforms facilitate collective inquiry, knowledge sharing, and active participation. The key elements they present are active participation, constructive feedback, peer learning conferences, and identified learning opportunities. These elements promote reflection, interaction, and mutual support. Peer feedback encourages learners to monitor their progress, reflect on their understanding, and regulate their learning [26]; [27]. Engagement occurs across three dimensions: behavioral (posting and responding), emotional (confidence and belonging), and cognitive (critical thinking and justification). Well-designed Q&A systems deepen cognitive engagement, cultivate academic community, and promote equity and participation.

(b) Adaptive and Personalized Learning:
AI and learning analytics enhance Q&A systems by classifying questions, detecting duplicates, suggesting responses, and recommending related resources, reducing redundancy and supporting higher-order tasks. Analytics track participation, highlight active contributors, and identify at-risk students, fostering continuous reflection and learner autonomy. Gamification, including badges, points, and reputation systems, can motivate engagement and accountability when aligned with meaningful learning objectives [25]. Together, these features allow Q&A systems to provide responsive, personalized, and scalable academic support.

(c) Synergy Between Peer Collaboration and Personalization:
By combining peer interaction with adaptive tools, Q&A platforms create a learning environment where students are both contributors and beneficiaries. Collaborative dialogue fosters SRL and critical thinking, while AI-driven personalization ensures efficient and targeted support. This integration fosters engagement, knowledge co-construction, and independent learning, making academic support more inclusive, scalable, and effective.

## 5. Pedagogical Foundations: Active Learning, Knowledge Sharing, and Feature Directions

The effectiveness of collaborative Q&A systems is based on pedagogical theories that emphasize active, social, and self-directed learning. Social constructivism, peer-assisted learning (PAL), and connectivism explain how students construct knowledge through interaction, collaboration, and reflection [34–36]. Social constructivism views learning as a social negotiation within the Zone of Proximal Development; collaborative Q&A platforms support this by enabling guided dialogue in which students pose questions, refine understanding through peer feedback, and receive instructor validation, transforming learning from passive reception to active co-construction [34].

PAL further reinforces learning through shared questioning and explanation, enhancing understanding, critical thinking, and academic self-efficacy [35, 36]. In digital Q&A environments, students act as both seekers and contributors of knowledge, encouraging reciprocal learning. Connectivism extends this idea to the digital context by framing learning as the ability to navigate networks of information and people. Q&A systems exemplify this through shared knowledge repositories, archival discussions, and tagging mechanisms that support evolving learning pathways [36, 37].

Overall, these theories position collaborative Q&A systems as more than just a communication tool, highlighting their role in fostering reflective thinking and student autonomy. Future work should focus on better integrating these principles to support adaptive, personalized, and scalable learning environments [34, 37, 38].

**Table 3** *Summary of pedagogical foundations*

| No. | Author(s) & Year | Focus | Method and Context | Key Findings and Implications | Implications for Q&A System Design |
|---|---|---|---|---|---|
| 1 | Topping & Ehly (1998) [35] | Peer-Assisted Learning (PAL) | Conceptual framework and Book | PAL improves comprehension, communication, and critical thinking; students benefit from reciprocal teaching roles | Q&A platforms should allow students to ask, answer, and moderate questions. Creating structured opportunities for reciprocal learning. |

| | | | | | |
|---|---|---|---|---|---|
| 2 | Shriram & Warner (2010) [38] | Connectivism & Web 2.0 Technologies | Conceptual analysis | Connectivist learning emphasizes forming and navigating information networks; technology integration enhances engagement | Systems should integrate social features, content curation, and networked interactions to extend learning beyond the classroom. |
| 3 | Edwards & Bone (2012) [34] | Social Constructivism & Peer Learning | Literature review & case studies in higher education | Collaborative dialogue enhances active learning; peer feedback supports knowledge construction | Q&A systems should facilitate guided peer discussions. Allow instructor validation and support the co-construction of knowledge. |
| 4 | Noerholk & Tolsgaard (2021) [36] | Peer-Assisted Learning in Medical Education | Systematic review and meta-analysis | PAL increases knowledge retention and academic self-efficacy; structured peer interactions enhance learning outcomes | Digital Q&A systems can include scaffolding, hints, or prompts to guide peer interactions and track participation for self-efficacy gains. |
| 5 | Fakir, Azman, & Zahid (2023) [37] | Connectivism and Online Group Work | Empirical study in higher education | Learning is networked; digital Q&A repositories facilitate navigation and sharing of knowledge | Q&A platforms should provide searchable archives, tagging systems, and recommendation features to support networked learning and evolving knowledge pathways. |

## 6. Conclusions

Most students face a variety of questions while at school. Students asking questions is a great way for them to get more out of each other. It also builds rapport and keeps them engaged in learning. This way, lecturers also don't have to answer repeated questions and can avoid inconsistencies in answers. A well-constructed Q&A setup fits in with how institutions are moving forward digitally while helping more students engage academically, supported by real data. Moving forward, research should examine how well the system performs over time, particularly across different campus locations. Another perspective involves using smarter technology tools to fine-tune their performance. When students collaborate to ask and answer questions, the results often shift toward building better learning spaces that respect the needs of diverse students. The result tends to be greater equity across the college environment when collaboration becomes part of everyday teaching life.

## Acknowledgement

We would like to express our appreciation for the support provided by all parties directly or indirectly involved in this research. We also thank our colleagues and collaborators for their support and assistance throughout the research process.

## Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of the paper.

## Author Contribution

*The authors are responsible for the study conception, research design, data collection, data analysis, result interpretation and manuscript drafting.*

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