

Effects of Collaboration and Social Interaction on Academic Performance in Online Animation Education

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ABSTRACT

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This study investigates the influence of collaboration and social interaction on undergraduate students' academic performance in online animation courses. Data were collected from 215 students at Qingdao Film Academy using a self-constructed questionnaire. The results indicate a significant positive correlation between students' perceptions of collaboration and a significant negative correlation between social interaction and their academic performance in the Anatomy for Animation course. The findings suggest that collaboration enhances academic achievement in this context, while excessive social interaction may hinder it.

Keywords: online animation course. Academic performance, collaboration, social interaction

Introduction

The integration of collaboration and social interaction in online education has become increasingly significant, particularly in fields such as animation education where creativity and teamwork are essential. The shift towards online learning environments has necessitated a deeper understanding of how these elements impact academic performance. Research has consistently shown that collaborative learning environments enhance student engagement and performance by fostering social interaction and peer support [1], [2], [3].

Social factors, such as interaction with peers and instructors, play a crucial role in developing collaborative learning and engagement, which in turn positively influences students' learning performance [1]. The constructivist approach, which emphasizes active student participation and interaction, supports the idea that social presence and engagement are vital for effective learning [1], [4]. In online settings, the sense of social presence can significantly enhance group cohesion and efficacy, leading to improved academic outcomes [3].

The use of social media and mobile technologies has further facilitated collaborative learning by enabling seamless communication and resource sharing among students and educators [5], [6], [4]. These platforms not only support academic collaboration but also enhance students' social self-efficacy, which is linked to better academic performance [2], [6]. However, the impact of social media on learning is complex, as it can also introduce distractions that may negatively affect academic outcomes [5].

Empirical studies have demonstrated that collaborative note-taking and group activities in online courses can lead to improved academic performance, particularly when students actively engage in creating comprehensive course materials [7]. This suggests that the benefits of collaboration may be realized over time as students become more adept at working together and utilizing shared resources.

Moreover, the integration of technology, such as artificial intelligence and mobile learning, has been shown to enhance academic performance by providing personalized learning experiences and support [2]. These technologies facilitate a more interactive and engaging learning environment, which is crucial for subjects like animation that require creativity and technical skills.

Despite the positive effects of collaboration and social interaction, challenges such as cyberbullying and cyberstalking can hinder the benefits of social media in educational settings [8]. It is essential to address these issues to ensure a safe and productive learning environment.

In conclusion, the literature underscores the critical role of collaboration and social interaction in shaping the academic experiences of students in online learning environments, particularly in creative and skill-based disciplines such as animation. While collaboration has been widely linked to improved engagement, knowledge retention, and performance, the effects of social interaction remain more complex—offering both opportunities for support and risks of distraction. Despite the growing body of research on online education, few studies have focused specifically on how these elements influence academic outcomes in animation education [9]. Therefore, this study investigates the influence of collaboration and social interaction on undergraduate students' academic performance in online animation courses. By focusing on these two factors, the research aims to provide empirical evidence that can inform the design of more effective, engaging, and performance-driven online animation learning environments.

Related Work

In online education, collaboration and social interaction have become essential components influencing learner success. Research has shown that social connectedness and collaborative engagement significantly affects academic outcomes, particularly in creative disciplines such as animation where exchange, analyze, peer and group workflows are fundamental. Diep *et al.* [10] found that the quality of online interaction mediates the relationship between collaborative activity and students' sense of social connectedness, which in turn contributes to course satisfaction and learning effectiveness.

Janah *et al.* [11] examined how the use of social media in collaborative learning environments supports online knowledge sharing. Their findings revealed that student engagement and academic performance improve when learners actively exchange ideas and materials in digital communities. This is particularly relevant to animation education, where process-based learning and peer feedback are key instructional

strategies. Similarly, Boruzie [12] investigated students' perceptions of social networking and concluded that platforms enabling group-based interaction positively influence university students' academic performance.

The structure and type of collaborative learning also matter. Cagatan and Quirap [13] found a significant correlation between promotive interaction and academic achievement. Their study supports the value of structured group activities that build interdependence, shared accountability, and peer encouragement. In a related study, Caoili-Tayuan and Ching [14] explored gender-based differences in the use of Facebook for academic collaboration. They found that while many students viewed social media as an effective learning tool, others expressed concerns about distraction and misuse, pointing to the need for guided engagement strategies.

Virtual classrooms gain a lot benefit when they are designed well. Feelings of belonging to a group and being present online supported both through good communication and Molka-Danielsen and Brask [15] have studied completing tasks in the virtual environment. These factors are crucial in animation education, where coordinated teamwork and shared creative vision are often necessary for project success. Burchart and Haake [16] applied collaborative learning strategies to academic writing in distance education. They observed that when collaboration was scaffolded through structured stages, student outcomes improved even in asynchronous formats.

These findings collectively suggest that collaborative learning and social interaction, when effectively facilitated, enhance academic performance and engagement in online learning. Their integration into online animation education is not only beneficial but also essential for fostering creative collaboration and achieving better academic outcomes.

Methodology

This study included 215 fourth-year undergraduate animation students (aged 21–23) at Qingdao Film Academy in Shandong Province, China, who had completed the *Anatomy for Animation (ANANTMY)* course, which was delivered through an online learning modality. Data were collected using a self-constructed questionnaire, available in both English and Chinese, to ensure clarity and accessibility for all participants. The research instrument underwent expert validation, and its reliability was tested. The research also passed the Ethics Review of the institution. The questionnaire was divided into sections assessing students' perceptions of collaboration (five items) and social interaction (five items) in their online learning experience. Students responded to each item using a 4-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree." Academic performance was measured by students' final grades in the *Anatomy for Animation* course, obtained from school records. Spearman's rank correlation coefficient was used to analyze the relationship between students' assessments of collaboration and social interaction, and their academic performance. The data was analyzed using Jamovi software, with a significance level set at 0.05.

Results and Discussion

Descriptive statistics indicated that students generally acknowledged the value of both collaboration and social interaction in their online learning. However, the correlation analysis revealed a significant positive relationship between students' assessments of collaboration ($\rho = 0.180$, $p = 0.008$) and their academic performance in the *Anatomy for Animation* course. This suggests that students who perceived collaboration as a valuable part of their online learning experience tended to achieve higher grades in the course. The relatively small p-value (0.008) indicates that this positive relationship is statistically significant, meaning it is unlikely to have occurred by chance.

Additionally, a significant negative relationship was found between students' assessment of social interaction ($\rho = -0.150$, $p = 0.028$) and their academic performance. This implies that students who

reported higher levels of social interaction with their peers in the online environment tended to have lower academic performance in the Anatomy for Animation course. Again, the p-value (0.028) suggests that this negative relationship is statistically significant.

In discussing the results of this study, it is essential to consider the broader context of online learning environments and the role of collaboration and social interaction in academic performance. The findings of this study align with existing literature, which emphasizes the importance of collaborative learning in enhancing academic outcomes. For instance, research has shown that collaborative learning facilitated through social media and other online platforms significantly impacts students' engagement and academic performance [6], [1], [16]. This is consistent with the positive correlation found between students' assessments of collaboration and their academic performance in the Anatomy for Animation course.

The positive relationship between collaboration and academic performance can be attributed to several factors. Collaborative learning environments encourage active participation, peer interaction, and knowledge sharing, which are crucial for deep learning and understanding [1], [16], [4]. These environments also foster a sense of community and support, which can enhance motivation and engagement, leading to improved academic outcomes [3], [17].

Recent studies reinforce these findings, providing further insights into the specific mechanisms and contexts where collaboration yields positive academic results. Collaborative learning has been shown to significantly enhance academic performance through mechanisms such as promotive interaction and positive interdependence [12]. Furthermore, the rise of digital learning has highlighted the benefits of Online Collaborative Learning (OCL), which has been found to improve both student achievement and engagement, particularly in remote or digital learning contexts [18]. The integration of social media into collaborative learning also contributes to academic success, with academic self-efficacy acting as a moderating factor in student performance [18]. Beyond achievement, collaborative learning environments have been linked to increased academic motivation—a key determinant of student success [19]. These environments also support proactive group learning strategies and deeper academic engagement, ultimately leading to improved academic outcomes [20].

In essence, both foundational and more recent research consistently underscore the positive impact of collaborative learning on academic performance. Whether through traditional in-person interactions or leveraging online platforms and social media, the principles of active participation, shared learning, and mutual support within collaborative settings contribute significantly to student success across various educational contexts.¹

Conversely, the negative relationship between social interaction and academic performance observed in this study is intriguing and warrants further exploration. While social interaction is generally considered beneficial for learning, excessive or unstructured social interaction may detract from academic focus and performance [21], [22]. It is possible that in the context of this study, social interactions were not effectively integrated into the learning process, leading to distractions rather than academic benefits. This aligns with findings from other studies that emphasize the importance of structured and purposeful social interactions to positively impact academic performance [23], [24], [22]. For instance, Salari [22] found a significant negative correlation between social media addiction and academic achievement among university students globally, indicating that excessive engagement with digital social networks can impair academic focus. Similarly, Chowdhury [25] noted that while social media can support educational endeavors, its overuse for non-academic purposes often leads to reduced study time, increased procrastination, and disrupted concentration, ultimately contributing to poorer academic outcomes.

Moreover, the role of social presence and its impact on group cohesion and efficacy in virtual learning environments has been highlighted in previous research [3]. While social presence can enhance group cohesion and engagement, it is crucial to balance social interactions with academic goals to ensure they contribute meaningfully to learning outcomes [3], [17]. The negative correlation observed in this study may indicate a need for more intentional, structured, and academically oriented social interactions within the online learning environment. Unstructured or excessive social engagement—especially in virtual spaces—may hinder rather than help students' academic performance, underscoring the necessity of guided interaction that aligns with instructional objectives.

The results of this study underscore the importance of collaboration in online learning environments and highlight the complex role of social interaction in academic performance. While collaboration positively influences academic outcomes, the nature and structure of social interactions are critical in determining their impact on learning. These findings suggest that educators should focus on fostering collaborative learning environments while carefully structuring social interactions to enhance academic performance.

Conclusion

This study revealed a significant positive correlation between students' perceptions of collaboration and their academic performance in an online Anatomy for Animation course, highlighting the importance of collaborative learning in this context. Conversely, a significant negative correlation was found between social interaction and academic performance, suggesting that while students may value social interaction, it can hinder academic success in this specific context. These findings suggest that educators should prioritize the design and implementation of effective collaborative activities in online animation courses to enhance student learning outcomes, while also carefully managing and structuring social interactions to ensure they support rather than detract from academic goals. Future research should continue to explore the specific types of collaborative and social interactions that are most beneficial for student learning in this discipline and investigate how technology can be used to support and enhance these experiences.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu

Tengc hao Zhang	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Imma nuel T. San Diego	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

C:Conceptualization

M:Methodology

So:Software

Va:Validation

Fo:Formal analysis

I :Investigation

R:Resources

D:DataCuration

O : Writing-Original Draft

E:Writing-Review&Editing

Vi:Visualization

Su:Supervision

P:Project administration

Fu:Funding acquisition

Data Availability

No new data were generated or analyzed in this study.

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