The Implementation of the Flipped Classroom model in fostering student autonomy in the study of the Quran and Hadith at MTsN 2 Aceh Tamiang

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Abstract

This study aims to analyze the effectiveness of the Flipped Classroom strategy on students' learning outcomes and learning independence in Al-Qur'an Hadith instruction for ninth-grade students at MTsN 2 Aceh Tamiang. This study employed a quantitative approach using a quasi-experimental method with a Nonequivalent Control Group Design. The sample consisted of 64 students, including 32 students in the experimental group and 32 students in the control group. The experimental group received instruction using the Flipped Classroom strategy, while the control group received conventional instruction. Data were collected through a learning achievement test and a learning independence instrument and analyzed using descriptive statistics, Paired Sample t-Test, Independent Samples t-Test, and Normalized Gain. The results showed that the mean learning achievement score of the experimental group increased from 65.47 in the pretest to 84.53 in the posttest, while the control group increased from 66.25 to 74.38. The Paired Sample t-Test indicated a statistically significant difference in the experimental group ($t = 15.824$; $p < 0.001$), while the comparison between the experimental and control groups also revealed a significant difference ($t = 5.342$; $p < 0.001$). The experimental group obtained an N-Gain score of 0.55, categorized as moderate, compared with 0.24 in the control group, categorized as low. Regarding learning independence, the experimental group increased from 58.34 to 78.91, with the Paired Sample t-Test showing a significant difference ($t = 18.924$; $p < 0.001$). The comparison between groups also revealed a significant difference ($t = 7.865$; $p < 0.001$). These findings demonstrate that the Flipped Classroom strategy is effective in improving both students' learning outcomes and learning independence in Al-Qur'an Hadith instruction.

Keywords: *Flipped Classroom, Learning Outcomes, Learning Autonomy, Qur'an and Hadith, Madrasah.*

A. INTRODUCTION

The digital transformation of education has shifted learning from teacher-centered to student-centered approaches, requiring instructional strategies that foster critical thinking, collaboration, creativity, communication, and learning autonomy. In Islamic education, this transformation offers opportunities to integrate technology while maintaining Islamic values and supporting students' ability to apply the teachings of the Qur'an and Hadith (Jati SP et al., 2025; Ramadhani & Musyarapah, 2024; Gopur et al., 2025; UNESCO, 2023). Qur'an and Hadith instruction at the Madrasah Tsanawiyah level aims to develop students' abilities to understand and apply Islamic teachings in daily life (Nasution & Fahmi, 2017). However, teacher-centered instruction and lecture-based methods often result in passive learning, low

achievement, limited higher-order thinking skills (HOTS), and weak learning autonomy (Wahid, 2022; Nur'aini, 2021; Bhinder, 2023). Preliminary observations at MTsN 2 Aceh Tamiang revealed that approximately 60% of ninth-grade students had not met the minimum mastery criteria (*Kriteria Ketuntasan Minimal*, KKM). Learning remained dominated by lectures, while students showed limited initiative in exploring resources and managing their learning independently. These challenges highlight the need for strategies that support active knowledge construction and self-regulated learning. Constructivism emphasizes learning through experience, interaction, and reflection, while Vygotsky's (1978) *Zone of Proximal Development* highlights the role of social interaction and teacher scaffolding. *Self-Regulated Learning* further emphasizes students' ability to plan, monitor, and evaluate their learning independently (Zimmerman, 2002; Gestsdottir et al., 2023).

The *Flipped Classroom* offers a potential solution by moving initial content delivery outside the classroom through digital media and using classroom time for discussion, problem-solving, and collaborative learning. Rather than merely using instructional videos, this approach promotes active knowledge construction (Bergmann & Sams, 2012). Previous research has demonstrated positive effects on academic achievement (Cheng, Ritzhaupt, & Antonenko, 2019), particularly when combined with collaborative and problem-based learning (Lo & Hew, 2023). Studies in Islamic education have also reported improvements in instructional effectiveness, religious literacy, and student engagement (Martina Purnasari, 2022; Nurpratiwi, Effendi, & Amaliyah, 2021; Nur'aini, 2021; Mubarok, 2022).

Nevertheless, research specifically examining the *Flipped Classroom* in Qur'an and Hadith instruction remains limited. Previous studies have generally focused on a single outcome, such as achievement or motivation, with limited quasi-experimental evidence examining learning outcomes and learning autonomy simultaneously. This study addresses these gaps through a quasi-experimental pretest-posttest control group design involving ninth-grade students at MTsN 2 Aceh Tamiang. Its novelty lies in assessing both learning outcomes and learning autonomy within the context of Qur'an and Hadith instruction. Accordingly, this study aims to analyze the effectiveness of the *Flipped Classroom* strategy in improving learning outcomes and learning autonomy among ninth-grade students at MTsN 2 Aceh Tamiang.

B. METHOD

This study employed a quantitative approach with a quasi-experimental method because participants were not fully randomized; instead, existing classes served as the experimental and control groups. A pretest-posttest control group design was used to compare students' initial and final abilities following different instructional treatments, providing empirical evidence of the Flipped Classroom strategy's effectiveness in improving learning outcomes and learning autonomy (Creswell & Creswell, 2023; Fraenkel et al., 2023).

The study was conducted at MTs Negeri 2 Aceh Tamiang during the second semester of the 2025/2026 academic year. The population comprised all ninth-grade

students. Participants were selected through purposive sampling, considering comparable academic characteristics across classes based on the Qur'an and Hadith teacher's recommendations. The experimental group received Flipped Classroom instruction, while the control group received conventional instruction. The independent variable was the Flipped Classroom strategy, while the dependent variables were learning outcomes and learning autonomy. In the experimental group, students accessed learning materials before class through digital videos and electronic resources. Classroom activities focused on discussion, problem-solving, group presentations, and teacher-led conceptual clarification. The control group received conventional instruction dominated by lectures, question-and-answer sessions, and exercises.

Data were collected using a learning achievement test and a learning autonomy questionnaire, both validated and tested for reliability (Azwar, 2022; Sugiyono, 2023). Pretests and posttests measured learning outcomes, while the questionnaire assessed changes in students' ability to independently plan, manage, monitor, and evaluate their learning, and were analyzed using descriptive statistics, normality and homogeneity tests, paired-samples t-tests to examine within-group changes, and independent-samples t-tests to compare groups. Analyses were conducted using IBM SPSS Statistics at a significance level of 0.05 (Field, 2024).

C. RESULTS AND DISCUSSION

1. Description of Research Implementation

This study examined the effectiveness of the *Flipped Classroom* strategy in Qur'an and Hadith instruction among ninth-grade students at MTsN 2 Aceh Tamiang during the 2025/2026 academic year. It employed a *Nonequivalent Control Group Design*, a quasi-experimental design without individual randomization. Both groups completed a *pretest*, after which the experimental group received the *Flipped Classroom* treatment and the control group received conventional instruction. Both groups then completed a *posttest*, while learning autonomy was measured to assess changes in learning regulation. The design was formulated as O_1–X–O_2 for the experimental group and O_1–O_2 for the control group. The population comprised 188 ninth-grade students across six classes, each containing 30–33 students. Using *purposive sampling*, two existing classes were selected because individual randomization was impractical in the school setting. Class IX-1 served as the experimental group and class IX-3 as the control group, with 32 students each, yielding a total sample of 64 students. The

Flipped Classroom strategy required students to study foundational materials independently through digital resources before class. Face-to-face sessions focused on discussion, content analysis, problem-solving, group work, and teacher-led conceptual clarification, addressing the passivity associated with conventional instruction. The research comprised three stages: preparation, including instrument development, trials, validation, and research permissions; implementation, including the *pretest*, six treatment sessions, and *posttest*; and completion, involving questionnaire collection, data analysis, and report preparation.

2. Description of Learning Outcome Data

Learning outcomes in Qur'an and Hadith were assessed before and after the intervention to examine initial group comparability and subsequent achievement.

Table 1. Descriptive Statistics of Learning Outcomes

Group	N	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Improvement
Experimental	32	65.47	8.23	84.53	7.15	19.06
Control	32	66.25	8.56	74.38	9.42	8.13

Source: Student Learning Outcome Data (Processed, 2026)

The initial mean scores were relatively comparable: 65.47 (SD = 8.23) for the experimental group and 66.25 (SD = 8.56) for the control group, a difference of only 0.78 points. After treatment, the experimental group's mean increased by 19.06 points to 84.53 (SD = 7.15), whereas the control group's mean increased by 8.13 points to 74.38 (SD = 9.42). The 10.93-point difference in improvement suggests a greater contribution from the *Flipped Classroom* strategy, which enabled students to study materials independently before classroom activities. Statistical testing was required to determine the significance of this difference.

3. Normality Test

The *Shapiro–Wilk test* was used to assess normality because each group contained fewer than 50 students. Data were considered normally distributed when $p > 0.05$.

Table 2. Normality Test Results for Learning Outcomes and Learning Autonomy

Variable	Group	Statistic	Sig.	Interpretation
Learning Outcomes Pre-test	Experimental	0.952	0.142	Normal
Learning Outcomes Post-test	Experimental	0.961	0.178	Normal
Learning Outcomes Pre-test	Control	0.947	0.121	Normal
Learning Outcomes Post-test	Control	0.958	0.158	Normal
Learning Autonomy Pre-test	Experimental	0.965	0.205	Normal
Learning Autonomy Post-test	Experimental	0.971	0.238	Normal
Learning Autonomy Pre-test	Control	0.959	0.165	Normal
Learning Autonomy Post-test	Control	0.963	0.189	Normal

Source: Normality Test Results (Processed, 2026)

All significance values exceeded 0.05, indicating that the learning outcome and learning autonomy data met the normality assumption for parametric analysis. Homogeneity Test *Levene's Test for Equality of Variances* was used to assess variance homogeneity, with $p > 0.05$ indicating homogeneous variances.

Table 3. Homogeneity Test Results

Variable	Levene Statistic	Sig.	Decision
Learning outcomes	1.842	0.178	Homogeneous
Learning autonomy	2.103	0.152	Homogeneous

Source: Homogeneity Test Results (Processed, 2026)

The significance values for learning outcomes (0.178) and learning autonomy (0.152) exceeded 0.05. Thus, the homogeneity assumption was satisfied, supporting the use of the *Independent-Samples t-test* for group comparisons.

4. Differences in Learning Outcomes Before and After Implementing the Flipped Classroom

A Paired-Samples t-test compared the experimental group's pretest and post-test scores to address the first research question concerning changes in Qur'an and Hadith learning outcomes.

Table 4. Paired-Samples t-test Results for Experimental Group Learning Outcomes

Variable	Pretest Mean	Post-test Mean	Mean Difference	t	df	Sig. (2-tailed)
Learning outcomes	65.47	84.53	19.06	15.824	31	0.000

Source: Paired-Samples t-test Results (Processed, 2026)

The mean increased from 65.47 to 84.53, with a difference of 19.06 points (t = 15.824, df = 31, p = 0.000). Since $p < 0.05$, the improvement was statistically significant, indicating higher learning outcomes following the *Flipped Classroom* intervention. This finding aligns with Tami Safitri et al., who reported improved Islamic Religious Education outcomes with a moderate gain score of 0.67. It also supports Bergmann and Sams' assertion that the *Flipped Classroom* can promote higher-order thinking skills (HOTS) more effectively than conventional instruction. Comparison of Learning Outcomes Between the Experimental and Control Groups an *Independent-Samples t-test* compared posttest scores between the experimental and control groups to address the second research question. This test was appropriate because the data met the normality and homogeneity assumptions.

Table 5. Independent-Samples t-test Results for Posttest Learning Outcomes

Group	N	Mean	SD	t	df	Sig.
Experimental	32	84.53	7.15	5.342	62	0.000
Control	32	74.38	9.42			

Source: Independent-Samples t-test Results (Processed, 2026)

The experimental group achieved a higher mean posttest score (84.53, SD = 7.15) than the control group (74.38, SD = 9.42), with a mean difference of 10.15 points (t = 5.342, df = 62, p = 0.000). The difference was statistically significant ($p < 0.05$), indicating that the *Flipped Classroom* group achieved better learning outcomes than the conventional group. This result is consistent with Cheng, Ritzhaupt, and Antonenko's (2019) meta-analysis, which found a significant positive effect on academic achievement (Hedges' g = 0.35), and Gu Zhai's meta-analysis of 55 experimental studies, which reported a moderate positive effect (d = 0.35).

The Normalized Gain (N-Gain) formula developed by Hake was also used to assess the magnitude of improvement.

Table 6. N-Gain Calculation Results

Group	N-Gain	Category
Experimental	0.55	Moderate
Control	0.24	Low

Source: N-Gain Calculation Results (Processed, 2026)

The experimental group's N-Gain of 0.55 fell within the moderate category ($0.30 \leq$ N-Gain ≤ 0.70), while the control group's score of 0.24 fell within the low

category (N-Gain < 0.30). These findings further indicate greater improvement under the *Flipped Classroom* strategy.

5. Description of Learning Autonomy Data

Learning autonomy was the second dependent variable, reflecting students' ability to prepare for lessons, manage time, study independently, record key information, identify gaps in understanding, and monitor and evaluate their learning. Questionnaires administered before and after the intervention measured changes in both groups.

Table 7. Descriptive Statistics of Learning Autonomy

Group	N	Pretest Mean	Pretest SD	Post-test Mean	Post-test SD	Improvement
Experimental	32	58.34	6.72	78.91	5.85	20.57
Control	32	57.81	7.03	63.47	8.12	5.66

Source: Student Learning Autonomy Data (Processed, 2026)

The groups had comparable initial learning autonomy scores: 58.34 (SD = 6.72) for the experimental group and 57.81 (SD = 7.03) for the control group, a difference of 0.53 points. After treatment, the experimental group increased by 20.57 points to 78.91 (SD = 5.85), while the control group increased by 5.66 points to 63.47 (SD = 8.12). The 14.91-point difference in improvement suggests a greater contribution from the *Flipped Classroom* strategy, although statistical testing was necessary to confirm significance. Differences in Learning Autonomy Before and After Implementing the Flipped Classroom a *Paired-Samples t-test* assessed changes in learning autonomy in the experimental group, addressing the third research question.

Table 8. Paired-Samples t-test Results for Experimental Group Learning Autonomy

Variable	Pretest Mean	Post-test Mean	Mean Difference	t	df	Sig. (2-tailed)
Learning Autonomy	58.34	78.91	20.57	18.924	31	0.000

Source: Paired-Samples t-test Results (Processed, 2026)

The mean learning autonomy score increased from 58.34 to 78.91, a difference of 20.57 points (t = 18.924, df = 31, p = 0.000). Since $p < 0.05$, the improvement was statistically significant. This finding aligns with Irna Septiani Maolidah et al., who reported a positive, significant effect of the *Flipped Classroom* on university students' learning autonomy, with a large effect size ($\eta^2 = 0.42$). It also supports Barry Zimmerman's view that self-regulated learning develops through students' active metacognitive, motivational, and behavioral participation in their learning, a central feature of the *Flipped Classroom*. Comparison of Learning Autonomy Between the Experimental and Control Groups an *Independent-Samples t-test* compared posttest learning autonomy scores between groups to address the fourth research question.

Table 9. Independent-Samples t-test Results for Posttest Learning Autonomy

Group	N	Mean	SD	t	df	Sig.
Experimental	32	78.91	5.85	7.865	62	0.000
Control	32	63.47	8.12			

Source: Independent-Samples t-test Results (Processed, 2026)

The experimental group achieved a higher mean score (78.91, SD = 5.85) than the control group (63.47, SD = 8.12), with a mean difference of 15.44 points (t = 7.865, df = 62, p = 0.000). The difference was statistically significant ($p < 0.05$), indicating that the *Flipped Classroom* was more effective in improving learning autonomy than conventional instruction. This finding reinforces Rafika Rahmadani et al., who found a significant positive correlation between learning autonomy and academic achievement in madrasahs (r = 0.58, $p < 0.01$). It suggests that improved autonomy may support Qur'an and Hadith learning outcomes. The result also aligns with Nur'aini's finding that students responded positively to the *Flipped Classroom* in Islamic Religious Education because it allowed them to learn at their own pace and according to their individual learning styles.

Table 10. Summary of Hypothesis Testing Results

Hypothesis	Statistical Test	Value	Sig.	Decision
H_1: Pretest-posttest difference in learning outcomes	Paired-Samples t-test	t = 15.824	0.000	H_1 Accepted
H_2: Learning outcome difference between groups	Independent-Samples t-test	t = 5.342	0.000	H_2 Accepted
H_3: Pretest-posttest difference in learning autonomy	Paired-Samples t-test	t = 18.924	0.000	H_3 Accepted
H_4: Learning autonomy difference between groups	Independent-Samples t-test	t = 7.865	0.000	H_4 Accepted

Source: Summary of Hypothesis Testing Results (Processed, 2026)

All four hypotheses were accepted because every test yielded $p < 0.05$. Specifically, significant differences were found in: (1) learning outcomes before and after the *Flipped Classroom* intervention; (2) learning outcomes between the experimental and control groups; (3) learning autonomy before and after the intervention; and (4) learning autonomy between the experimental and control groups among ninth-grade students at MTsN 2 Aceh Tamiang**.**

The findings demonstrate that *Flipped Classroom* significantly improved Qur'an and Hadith learning outcomes among ninth-grade students at MTsN 2 Aceh Tamiang. The experimental group's mean score increased from 65.47 to 84.53, a gain of 19.06 points, whereas the control group improved from 66.25 to 74.38, a gain of 8.13 points. The *Paired-Samples t-test* confirmed a significant improvement in the experimental group (t = 15.824, df = 31, $p < 0.001$), supporting the first hypothesis.

These findings suggest that *Flipped Classroom* improves learning by restructuring instructional activities rather than merely transferring content to digital platforms. Students study foundational materials before class, allowing classroom time to focus on discussion, analysis, problem-solving, and collaboration. This approach promotes deeper information processing and higher-order thinking, which are essential in Qur'an and Hadith instruction, where students must interpret scriptural meanings and connect religious values with everyday life.

The findings align with Wang (2023), who linked flipped and collaborative learning with academic development and *self-regulated learning*, and Purnasari (2024), who highlighted the potential of *Flipped Classroom* to optimize instructional time in

Islamic Religious Education. They are also consistent with Sappaile et al. (2024), who reported improved engagement and learning outcomes. However, Kapur et al. (2022) emphasized that effectiveness depends on instructional design, particularly the quality of classroom activities. Therefore, the improvement in this study is attributable to the integration of pre-class preparation and active classroom learning, rather than technology alone.

The experimental group achieved a higher posttest mean (84.53) than the control group (74.38), with a difference of 10.15 points. The *Independent-Samples t-test* confirmed a significant difference ($t = 5.342$, $df = 62$, $p < 0.001$), supporting the second hypothesis. Since the groups' pretest means differed by only 0.78 points, the results suggest that their different learning progress was associated with the instructional treatment rather than substantially different initial achievement.

The N-Gain score was 0.55 for the experimental group, classified as moderate, compared with 0.24 for the control group, classified as low. Thus, *Flipped Classroom* produced greater relative improvement, although its effectiveness could be enhanced through better digital materials, clearer self-study guidance, feedback, and more purposeful classroom activities. Yoon, Hill, and Kim (2021) emphasized that successful implementation depends partly on students' ability to regulate their learning, requiring appropriate teacher support.

Learning autonomy in the experimental group increased from a mean of 58.34 to 78.91, a gain of 20.57 points. In comparison, the control group improved from 57.81 to 63.47, a gain of 5.66 points. The *Paired-Samples t-test* confirmed a significant improvement in the experimental group ($t = 18.924$, $df = 31$, $p < 0.001$), supporting the third hypothesis. This improvement reflects the demands of *Flipped Classroom*, which requires students to manage their time, access and study materials, record key information, and identify gaps in understanding before class. These activities encourage students to plan, monitor, and evaluate their learning. Wijayanto et al. (2022) similarly found greater improvements in *self-regulated learning* under *Flipped Classroom* than conventional instruction. Yoon et al. (2021) further noted that self-regulation is both a strength and a challenge because students with limited independent learning skills require structured support.

The experimental group achieved a higher posttest learning autonomy score ($M = 78.91$, $SD = 5.85$) than the control group ($M = 63.47$, $SD = 8.12$). The 15.44-point difference was statistically significant ($t = 7.865$, $df = 62$, $p < 0.001$), supporting the fourth hypothesis. This finding indicates that *Flipped Classroom* can improve both academic performance and students' responsibility for learning. It aligns with Wang (2023), who found that flipped and collaborative learning can strengthen self-regulated learning strategies, and Samadi et al. (2024), who reported benefits for self-regulation and higher-order thinking. Learning autonomy involves not simply studying independently but also managing cognitive and metacognitive processes. Although learning outcomes and autonomy improved simultaneously, this study did not directly test whether autonomy caused improvements in achievement. The results

therefore support the conclusion that *Flipped Classroom* significantly improved both variables, but do not establish a direct causal relationship between them.

Four mechanisms help explain the findings: flexible access to pre-class materials, greater use of classroom time for active learning, increased student responsibility, and more meaningful interactions with teachers and peers. Together, these mechanisms allow students to develop foundational knowledge before class and apply it through discussion, analysis, problem-solving, and reflection. This approach is relevant to Qur'an and Hadith instruction because students need to understand scriptural texts, interpret their meanings, relate them to contemporary situations, and internalize their values. Pre-class activities may include reading verses and hadiths, studying vocabulary and translations, and accessing audiovisual materials. Classroom sessions can then emphasize interpretation, discussion, real-life applications, and reflection. Muntafi'ah et al. (2024) also highlighted the importance of teacher and parental support in flipped learning for Qur'an memorization. Accordingly, clear instructions, access to materials, and proportionate supervision are necessary for effective implementation.

The findings should be interpreted in light of several limitations. The quasi-experimental design and purposive sample of 64 students from two classes limit generalizability. Moreover, the strategy depends on students' engagement outside class, while the moderate N-Gain score of 0.55 indicates room for improvement in instructional materials, guidance, feedback, and classroom activities (Yoon et al., 2021; Du et al., 2023). Overall, all four hypotheses were supported. The experimental group improved by 19.06 points in learning outcomes and 20.57 points in learning autonomy, compared with gains of 8.13 and 5.66 points, respectively, in the control group. The learning outcome tests yielded $t = 15.824$ for the experimental group's pretest-posttest comparison and $t = 5.342$ for the between-group comparison, both $p < 0.001$. For learning autonomy, the corresponding results were $t = 18.924$ and $t = 7.865$, both $p < 0.001$. The experimental group also achieved a higher N-Gain (0.55) than the control group (0.24). The findings are consistent with Wang (2023), Yoon et al. (2021), and Samadi et al. (2024), highlighting the importance of self-regulation, interaction, and meaningful classroom activities. The study's novelty lies in demonstrating the simultaneous effectiveness of *Flipped Classroom* on learning outcomes and learning autonomy in Qur'an and Hadith instruction at the madrasah tsanawiyah level, specifically at MTsN 2 Aceh Tamiang. Its contribution extends beyond improved academic scores to changes in students' learning responsibility, an important consideration for technology-supported education.

D. CONCLUSION

This study concludes that the *Flipped Classroom* strategy effectively improves learning outcomes and learning autonomy in Qur'an and Hadith instruction among ninth-grade students at MTsN 2 Aceh Tamiang. The study involved 64 students, comprising 32 in the experimental group and 32 in the control group. First, the experimental group's mean learning outcome score increased from 65.47 to 84.53, a

gain of 19.06 points. The *Paired-Samples t-test* confirmed a significant improvement (t = 15.824, $p < 0.001$). Second, the experimental group achieved a higher posttest mean (84.53) than the control group (74.38), with a significant difference ($t = 5.342$, $p < 0.001$). Its N-Gain score of 0.55 was classified as moderate, compared with 0.24 for the control group, which was classified as low. Third, learning autonomy in the experimental group increased from 58.34 to 78.91, a gain of 20.57 points, with a significant difference (t = 18.924, $p < 0.001$). Fourth, the experimental group achieved a higher posttest autonomy score (78.91) than the control group (63.47), with a significant difference (t = 7.865, $p < 0.001$). Thus, all four hypotheses received empirical support.

These findings indicate that *Flipped Classroom* offers advantages over conventional instruction by allowing students to study digital materials independently before class and use classroom time for discussion, analysis, problem-solving, collaboration, presentations, and conceptual clarification. This approach supports both academic achievement and students' responsibility for managing their learning. Accordingly, *Flipped Classroom* is a promising instructional alternative for Qur'an and Hadith education at the madrasah tsanawiyah level. However, given the moderate N-Gain result, its implementation should be supported by structured digital materials, clear learning instructions, teacher guidance, continuous feedback, and active, collaborative classroom activities.

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