THE EFFECT OF THE COLLABORATIVE POMODORO TECHNIQUE AND QUR'ANIC *MUROTTAL* ON STUDENTS' LEARNING MOTIVATION IN BIOLOGY LESSONS

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Abstract

This study employed a quasi-experimental design to analyze the implementation of a collaborative approach combining the Pomodoro Technique and Qur'anic *murottal* recitation on students' motivation in Biology learning. The research population comprised all eleventh-grade students, and the sampling technique used was saturation sampling because the population was fewer than 100 students. The sample consisted of three classes: Class XI-C as Experimental Group I, which received the combined treatment of the Pomodoro Technique and Qur'anic *murottal* recitation; Class XI-B as Experimental Group II, which received the Pomodoro Technique treatment; and Class XI-A as Experimental Group III, which received the Qur'anic *murottal* recitation treatment. The data were analyzed using descriptive and inferential statistics through an ANCOVA test with the assistance of SPSS at a significance level of 0.05. The results of the analysis indicated that learning motivation yielded a p-value of 0.072. Therefore, it can be concluded that the collaboration between the Pomodoro Technique and Qur'anic *murottal* recitation did not have a statistically significant effect on students' learning motivation, nor was its implementation substantially different. This finding is influenced by the school environment, which possesses a strong academic and religious atmosphere, thereby familiarizing students with spiritually integrated learning. In addition, all classes demonstrated strong initial motivation, active participation, and enthusiasm throughout the learning process.

Keywords: Pomodoro Technique, Qur'anic *murottal* recitation, learning motivation, Biology

INTRODUCTION

In the Islamic perspective, education is directed toward shaping human beings as servants of Allah Almighty who possess faith while simultaneously fulfilling their role as *khalifah* (vicegerent) on earth. The objectives of Islamic education are aligned with the purpose of human creation, namely to develop intellectual capacities, cultivate noble character, and adhere to the teachings and provisions of the Sharia. Furthermore, Islamic education provides broad opportunities for each individual to

optimize their inherent potential. Through this process, individuals are expected to acquire the knowledge and skills necessary to carry out their responsibilities as servants of God in worldly life.[1]

Biology learning often faces challenges in maintaining students' motivation, particularly given the subject's complexity and the demands of memorization.[2] Factors such as limited variation in teaching methods and insufficient active student engagement may further exacerbate motivational issues in the learning process.[3] The dominance of traditional instructional approaches often creates a rigid, passive classroom atmosphere, reducing students' motivation and enthusiasm and ultimately affecting their academic achievement.[4]

Based on the results of the preliminary observation conducted at MA Madani Alauddin, particularly among students in classes XI A, XI B, and XI C, the topic of the human digestive system was found to be relatively difficult to understand. A total of 60.2% of the students reported that this material is challenging. Therefore, the digestive system topic was selected as the focus of this study, as it is deemed to require a more optimal instructional approach.

In addition, the material on the digestive system is relevant to examine through an integrative perspective between science and Islam. This is supported by the study by Farihah and Septiadi (2019), which explains that the Qur'an, specifically Surah An-Nahl, verses 66 and 69, describes biological processes such as the formation of milk and honey in the digestive systems of animals. The integration of these verses into the learning process enables students not only to understand biological concepts but also to foster spiritual reflection on the greatness of Allah Almighty.[5]

Furthermore, students' learning motivation was relatively low. A total of 98.8% of respondents indicated that their motivation needs improvement. This finding is consistent with the study conducted by Kesuma et al. (2021) at SMP Negeri 1 Blahbatuh, which revealed that low student motivation can be observed during the implementation of conventional teaching methods.[6]

A high level of fatigue during prolonged learning sessions leads 62.7% of students to struggle to maintain focus, while 96.4% report a need for more active learning methods. This indicates that continuous, unbroken instruction may reduce students' engagement in learning. This finding is consistent with the study by Jamaluddin (2024) in the Biology Education Program at Universitas Negeri Makassar, which reported that lecture-based methods are associated with low levels of students' scientific attitudes.[7]

Both intrinsic and extrinsic motivation have a direct, positive influence on academic performance, and intrinsic motivation also mediates the effect of extrinsic motivation on academic

[1] Hidayat, Tatang, Ahmad Syamsu Rizal, dan Fahrudin. (2018). "Pendidikan Dalam Perspektif Islam dan Peranannya dalam Pembina Kepribadian Islami." *Jurnal Mudarissuna*, 8(2): 218.

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[5] Farihah, U., & Septiadi, D. D. (2019). "The development of natural science learning material integrated with islamic values to attract santris' interest in learning the human digestive system." *IOP Conference Series Earth and Environmental Science*: 2. https://doi.org/10.1088/1755-1315/243/1/012049

[6] Kesuma, I Nyoman Agus Adi, et al. (2021). "Pengaruh Model Pembelajaran dan Motivasi Terhadap Hasil Belajar PJOK Pada Siswa SMP." *Jurnal Penjakora*, 8(1): 67.

[7] Jamaluddin, Asham B, et al. (2024). "Empowering Scientific Attitudes in Biology Students through the SIRI Learning Model." *Jurnal Penelitian Pendidikan IPA* (*JPPIPA*), 10(6): 3208, DOI: 10.29303/jppipa.v10i6.7080

achievement.[8] Intrinsic motivation, which originates from an individual's internal drive, is crucial in shaping students' mental resilience in facing learning difficulties and in perceiving academic activities as a personal necessity rather than merely an obligation.[9] This is further supported by research indicating that regular study habits strongly influence academic achievement.[10]

An approach that can enhance students' learning motivation is implementing the Pomodoro Technique, a time-management method developed by Francesco Cirillo in the late 1980s. The term "Pomodoro" is derived from the Italian word for "tomato," referring to the tomato-shaped mechanical timer used by Cirillo when he developed this method.[11] The essence of the Pomodoro Technique lies in dividing work time into short, focused intervals, typically 25 minutes, interspersed with brief breaks, to enhance productivity and sustain concentration. Research has demonstrated that high levels of learning motivation are positively correlated with active engagement in the learning process, persistence in facing challenges, and the ability to seek solutions to difficulties.[12]

The preliminary observation data also indicated that 73.5% of students had never tried the Pomodoro technique integrated with Qur'anic *murottal*; however, the majority preferred a learning system with regular breaks. The implementation of the Pomodoro technique as a form of distributed learning is explained in the study by Trisnantari and Jabbar (2025), which found that the use of the Pomodoro technique alone can contribute to increased learning activity through structured time management and based on attention span theory, students' attention is inherently limited and tends to decline when learning sessions are prolonged without sufficient breaks.[13]

Moreover, Qur'anic *murottal* can create a calmer learning atmosphere. Observational data indicate that 89.2% of students feel more relaxed when listening to *murottal*. This provides a strong basis for integrating Qur'anic *murottal* into the learning process to enhance students' sense of calmness and comfort. This finding is consistent with the study by Wahyuningsih et al. (2025), which reported that listening to Qur'anic *murottal* enhances individuals' concentration, thereby creating a learning environment that supports focus and improves learning effectiveness.[14]

In addition to conducting observations in the three Grade XI classes, information was also obtained from an interview with the Biology teacher, Mr. Said, S.Pd. The interview revealed that students across the three Grade XI classes at MA Madani Alauddin predominantly exhibit a kinesthetic learning style. However, auditory and audio-visual learning styles also significantly influence learning in these classes, as the Biology teacher frequently presents instructional videos on

[8] Liu, Frontiers in Psychology. (2024). "The impacts of learning motivation, emotional engagement and psychological capital on academic performance in a blended learning course." *Frontiers in Psychology*, 15: 3, https://doi.org/10.3389/fpsyg.2024.1357936

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[11] Cirillo, F. (2006). *The Pomodoro Technique*. San Francisco, California, USA.

[12] Mumtazah, M. R., & Triyana, I. W. (2025). "KEMAMPUAN PEMAHAMAN KONSEP BANGUN RUANG DITINJAU DARI MOTIVASI BELAJAR." *SCIENCE Jurnal Inovasi Pendidikan Matematika Dan IPA*, 5(3): 1189. https://doi.org/10.51878/science.v5i3.6666

[13] Trisnantari, H. E., & Jabbar, Moch. R. A. A. (2025). "Desain Supervisi Pendidikan Islam Berbasis Psikologi dalam Meningkatkan Kualitas Pembelajaran." *Social: Jurnal Inovasi Pendidikan IPS*, 5(1): 219. https://doi.org/10.51878/social.v5i1.4887

[14] Wahyuningsih, N., et al. (2025). "A comparative study on the effectiveness of listening to music and Qur'anic murottal on students' concentration and study productivity." *Psychology Research on Education and Social Sciences*, 6(3): 146, https://doi.org/10.5281/zenodo.17208221

the school's Smart TV during instruction. Furthermore, the Pomodoro technique has never been implemented by the Biology teacher. Meanwhile, listening to Qur'anic *murottal* during the learning process has only been carried out once in the previous academic year.[15]

Several previous studies have demonstrated that the Pomodoro technique can positively impact learning. A study by Muhammad Harits et al. (2024) found that implementing the Pomodoro technique can improve students' learning quality, as indicated by increased concentration, active participation, and improved learning outcomes.[16] Similar findings were reported by Nuranisya (2024), who stated that the Pomodoro technique is effective in improving students' learning outcomes in Islamic Religious Education.[17] In addition, Nasution et al. (2022) found that the Pomodoro technique helps university students manage their study time more systematically, thereby enhancing learning effectiveness, particularly in online learning contexts.[18] Another study by Afiah et al. (2024) also showed that the Pomodoro technique significantly improves students' learning outcomes in History subjects.[19]

Nevertheless, most of these studies primarily focus on improving learning outcomes or general learning effectiveness. Research examining the effect of the Pomodoro technique on learning motivation, particularly in Biology instruction, remains relatively limited.

Moreover, in previous studies, the Pomodoro technique has generally been used as a single strategy, without being integrated with other approaches that may support students' psychological well-being during learning. Therefore, investigating the implementation of a collaborative Pomodoro technique integrated with Qur'anic *murottal* in Biology learning is important, particularly to examine its effect on students' learning motivation.

Therefore, the combination of a structured time-management technique such as the Pomodoro Technique and audio-based relaxation elements has the potential to create an optimal learning environment, addressing students' need for more engaging methods and calming conditions.

RESEARCH METHODS

This study employed a quasi-experimental method using a Non-equivalent (Pretest–Posttest) Multiple Experimental Group Design, involving three intact classes that received different treatments.

Table 1. Research Design

Class	Pretest	Treatment	Posttest
Experimental class 1	O_1	X_1	O_2
Experimental class 2	O_1	X_2	O_2
Experimental class 3	O_1	X_3	O_2

[15] Said, wawancara oleh peneliti, Gowa, 27 Juli 2025.

[16] Harits, Muhammad, et al. (2024). "Peningkatan Kualitas Belajar Peserta Didik Kelas X IPS 1 dengan Teknik Pomodoro." *Seminar Nasional PPG UNIKAMA*, 1, h: 818.

[17] Nuranisya, A. (2024). "Efektifitas Penerapan Teknik Pomodoro pada Mata Pelajaran PAI untuk Meningkatkan Hasil Belajar Peserta Didik di SMA Negeri 3 Parepare." *Skripsi: Program Studi Pendidikan Agama Islam, Fakultas Tarbiyah, Institut Agama Islam Parepare.*

[18] Nasution, Muhammad Zaki Zikrillah, et al. (2022). "Penerapan Teknik Pomodoro dalam Upaya Meningkatkan Efektifitas Belajar Mahasiswa pada Masa Pandemi Covid-19 di Kelas Sistem Informasi-3." *Jurnal Inovasi Penelitian*, 3(5): 6037.

[19] Afiah, Via, et al. (2024). "Pengaruh Teknik Pembelajaran Pomodoro Terhadap Hasil Belajar Siswa pada Mata Pelajaran Sejarah Kelas X di MAN 4 Tangerang." *CENDEKIA: Jurnal Pendidikan dan Pembelajaran*, 18(1): 108. doi.org/10.30957/cendekia.v18i1.896.

Description:
X_1 : Experimental Treatment 1, the collaboration of the Pomodoro Technique and Qur'anic murottal recitation
X_2 : Experimental Treatment 2, the Pomodoro Technique
X_3 : Experimental Treatment 3, Qur'anic *murottal* recitation
O_1 : Pretest (scores obtained before the treatment)
O_2 : Posttest (scores obtained after the treatment)

This study was conducted among eleventh-grade students at MA Madani Alauddin, located at Jl. Bontotanga Lrg. Bonto Salama No. 36, Paccinongan, Somba Opu District, Gowa Regency. The research was carried out during the 2025–2026 academic year, in the even semester, from November to December.

The population of this study consisted of all eleventh-grade students at MA Madani Alauddin, divided into three classes, totaling 84 students.

This study employed a non-probability sampling technique, specifically saturation sampling, in which the entire population is included as the sample. This technique is typically applied when the population size is relatively small (< 100 individuals).[20] The research sample comprised Class XI C as Experimental Class 1, Class XI B as Experimental Class 2, and Class XI A as Experimental Class 3.

The instrument used in this study was a learning motivation questionnaire based on the ARCS model developed by John M. Keller, which includes four components: Attention, Relevance, Confidence, and Satisfaction. This model is grounded in the idea that four key elements in the learning process help build and sustain students' motivation to learn. The strength of the ARCS model lies in its structured formulation of pedagogical strategies within each component, which are further elaborated into more detailed instructional sub-components.[21] The following presents the validity and reliability testing of the ARCS Keller motivation questionnaire instrument, in which each experimental class utilized a motivation questionnaire with different content:

Validity and Reliability Testing of the Motivation Questionnaire for Experimental Class 1

Table 1. Results of the Validity Test of the Motivation Questionnaire for Experimental Class 1

[20] Handayani, et al. (2025). *Metode Penelitian Bagi Mahasiswa Dan Tenaga Kesehatan*. Jawa Barat: PT. Adab Indonesia.
[21] Setyowati, Dwi, Riskan Qadar dan Shelly Efwinda. (2022). "Analisis Motivasi Siswa Berdasarkan Model ARCS (Attention, Relevance, Confidence, and Satisfaction) dalam Pembelajaran Fisika Berbasis E-Learning di SMA Se-Samarinda." *Jurnal Literasi Pendidikan Fisika*, 3(2): 120, https://doi.org/10.30872/jlpf.v3i2.1044

Correlations

		A1	A2	A3	A4	A5	R1	R2	R3	R4	R5	C1	C2	C3	C4	C5	S1	S2	S3	S4	S5	Total1
A1	Pearson Correlation	1	.338	.504**	.617**	.618**	.535**	.422*	.384*	.347	.589**	.533**	.535**	.247	.092	.112	.107	.092	-.043	.104	-.015	.555**
	Sig. (2-tailed)		.073	.005	.000	.000	.003	.023	.040	.065	.001	.003	.003	.196	.636	.563	.580	.636	.824	.593	.938	.002
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A2	Pearson Correlation	.338	1	.344	.387*	.281	.623**	.564**	.255	.476**	.651**	.574**	.505**	.428*	.451*	.470*	.627**	.451*	.344	.510**	.438*	.725**
	Sig. (2-tailed)	.073		.067	.038	.140	.000	.001	.182	.009	.000	.001	.005	.021	.014	.010	.000	.014	.067	.005	.018	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A3	Pearson Correlation	.504**	.344	1	.686**	.681**	.403*	.653**	.204	.137	.407*	.344	.591**	.421*	-.038	.079	.295	.062	.094	.182	-.056	.543**
	Sig. (2-tailed)	.005	.067		.000	.000	.030	.000	.289	.479	.028	.067	.001	.023	.846	.686	.121	.751	.629	.344	.773	.002
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A4	Pearson Correlation	.617**	.387*	.686**	1	.722**	.608**	.589**	.445*	.465*	.697**	.505**	.608**	.349	.100	.138	.310	.306	.214	.347	.167	.711**
	Sig. (2-tailed)	.000	.038	.000		.000	.000	.001	.015	.011	.000	.005	.000	.063	.607	.474	.102	.106	.264	.065	.386	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A5	Pearson Correlation	.618**	.281	.681**	.722**	1	.531**	.596**	.450*	.161	.462*	.395*	.531**	.370*	-.093	.031	.229	.107	.132	.121	.085	.576**
	Sig. (2-tailed)	.000	.140	.000	.000		.003	.001	.014	.405	.012	.034	.003	.048	.630	.873	.231	.580	.493	.531	.662	.001
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R1	Pearson Correlation	.535**	.623**	.403*	.608**	.531**	1	.694**	.549**	.718**	.814**	.623**	.412*	.266	.203	.241	.417*	.203	.214	.347	.272	.734**
	Sig. (2-tailed)	.003	.000	.030	.000	.003		.000	.002	.000	.000	.000	.026	.163	.291	.207	.024	.291	.264	.065	.153	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R2	Pearson Correlation	.422*	.564**	.653**	.589**	.596**	.694**	1	.386*	.359	.637**	.691**	.589**	.499**	.119	.256	.484**	.230	.248	.386*	.207	.728**
	Sig. (2-tailed)	.023	.001	.000	.001	.001	.000		.039	.056	.000	.000	.001	.006	.539	.180	.008	.230	.194	.039	.281	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R3	Pearson Correlation	.384*	.255	.204	.445*	.450*	.549**	.386*	1	.510**	.574**	.506**	.237	.377*	.398*	.415*	.326	.288	.204	.326	.162	.608**
	Sig. (2-tailed)	.040	.182	.289	.015	.014	.002	.039		.005	.001	.005	.216	.044	.033	.025	.085	.130	.289	.085	.401	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R4	Pearson Correlation	.347	.476**	.137	.465*	.161	.718**	.359	.510**	1	.745**	.476**	.212	.180	.304	.254	.298	.215	.137	.343	.178	.571**
	Sig. (2-tailed)	.065	.009	.479	.011	.405	.000	.056	.005		.000	.009	.269	.351	.109	.185	.116	.264	.479	.068	.355	.001
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R5	Pearson Correlation	.589**	.651**	.407*	.697**	.462*	.814**	.637**	.574**	.745**	1	.791**	.580**	.393*	.391*	.402*	.449*	.391*	.182	.442*	.260	.821**
	Sig. (2-tailed)	.001	.000	.028	.000	.012	.000	.000	.001	.000		.000	.001	.035	.036	.030	.015	.036	.344	.016	.173	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C1	Pearson Correlation	.533**	.574**	.344	.505**	.395*	.623**	.691**	.506**	.476**	.791**	1	.505**	.428*	.326	.470*	.369*	.326	.117	.369*	.184	.716**
	Sig. (2-tailed)	.003	.001	.067	.005	.034	.000	.000	.005	.009	.000		.005	.021	.084	.010	.049	.084	.544	.049	.340	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C2	Pearson Correlation	.535**	.505**	.591**	.608**	.531**	.412*	.589**	.237	.212	.580**	.505**	1	.598**	.410*	.447*	.524**	.513**	.497**	.463*	.483**	.780**
	Sig. (2-tailed)	.003	.005	.001	.000	.003	.026	.001	.216	.269	.001	.005		.001	.027	.015	.004	.004	.006	.011	.008	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C3	Pearson Correlation	.247	.428*	.421*	.349	.370*	.266	.499**	.377*	.180	.393*	.428*	.598**	1	.347	.466*	.444*	.523**	.421*	.492**	.320	.655**
	Sig. (2-tailed)	.196	.021	.023	.063	.048	.163	.006	.044	.351	.035	.021	.001		.065	.011	.016	.004	.023	.007	.090	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C4	Pearson Correlation	.092	.451*	-.038	.100	-.093	.203	.119	.398*	.304	.391*	.326	.410*	.347	1	.899**	.623**	.673**	.658**	.638**	.452*	.589**
	Sig. (2-tailed)	.636	.014	.846	.607	.630	.291	.539	.033	.109	.036	.084	.027	.065		.000	.000	.000	.000	.000	.014	.001
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C5	Pearson Correlation	.112	.470*	.079	.138	.031	.241	.256	.415*	.254	.402*	.470*	.447*	.466*	.899**	1	.656**	.682**	.673**	.648**	.477**	.655**
	Sig. (2-tailed)	.563	.010	.686	.474	.873	.207	.180	.025	.185	.030	.010	.015	.011	.000		.000	.000	.000	.000	.009	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S1	Pearson Correlation	.107	.627**	.295	.310	.229	.417*	.484**	.326	.298	.449*	.369*	.524**	.444*	.623**	.656**	1	.736**	.809**	.704**	.599**	.746**
	Sig. (2-tailed)	.580	.000	.121	.102	.231	.024	.008	.085	.116	.015	.049	.004	.016	.000	.000		.000	.000	.000	.001	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S2	Pearson Correlation	.092	.451*	.062	.306	.107	.203	.230	.288	.215	.391*	.326	.513**	.523**	.673**	.682**	.736**	1	.757**	.761**	.674**	.669**
	Sig. (2-tailed)	.636	.014	.751	.106	.580	.291	.230	.130	.264	.036	.084	.004	.004	.000	.000	.000		.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S3	Pearson Correlation	-.043	.344	.094	.214	.132	.214	.248	.204	.137	.182	.117	.497**	.421*	.658**	.673**	.809**	.757**	1	.744**	.755**	.609**
	Sig. (2-tailed)	.824	.067	.629	.264	.493	.264	.194	.289	.479	.344	.544	.006	.023	.000	.000	.000	.000		.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S4	Pearson Correlation	.104	.510**	.182	.347	.121	.347	.386*	.326	.343	.442*	.369*	.463*	.492**	.638**	.648**	.704**	.761**	.744**	1	.511**	.702**
	Sig. (2-tailed)	.593	.005	.344	.065	.531	.065	.039	.085	.068	.016	.049	.011	.007	.000	.000	.000	.000	.000		.005	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S5	Pearson Correlation	-.015	.438*	-.056	.167	.085	.272	.207	.162	.178	.260	.184	.483**	.320	.452*	.477**	.599**	.674**	.755**	.511**	1	.531**
	Sig. (2-tailed)	.938	.018	.773	.386	.662	.153	.281	.401	.355	.173	.340	.008	.090	.014	.009	.001	.000	.000	.005		.003
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Total1	Pearson Correlation	.555**	.725**	.543**	.711**	.576**	.734**	.728**	.608**	.571**	.821**	.716**	.780**	.655**	.589**	.655**	.746**	.669**	.609**	.702**	.531**	1
	Sig. (2-tailed)	.002	.000	.002	.000	.001	.000	.000	.000	.001	.000	.000	.000	.000	.001	.000	.000	.000	.000	.000	.003	
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Based on the results of the instrument validity test in Experimental Class 1, with 29 respondents, the r-table value was 0.3673 at the 5% significance level. The results of the Pearson correlation analysis indicated that all items had r-count values greater than the r-table value; therefore, all items were declared valid. For the Attention (A) indicator, which consists of items A1 to A5, the r-count values ranged from 0.543 to 0.725, indicating that all items under this indicator are valid. For the Relevance (R) indicator, consisting of items R1 to R5, the r-count values ranged from 0.571 to 0.821. These values exceed the r-table value; thus, all items were declared valid. Furthermore, for the Confidence (C) indicator, which includes items C1 to C5, the r-count values ranged from 0.589 to 0.780, indicating that all items met the validity criteria. For the Satisfaction (S) indicator, consisting of items S1 to S5, the r-count values ranged from 0.531 to 0.746, and all values were greater than the r-table value; therefore, all items were also declared valid. In conclusion, all 20 items of the ARCS motivation instrument in Experimental Class 1 are valid, as they have r-count values greater than the r-table value (0.3673). Therefore, the research instrument is considered appropriate for use.

Table 2. Results of the Reliability Test of the Motivation Questionnaire for Experimental Class 1

Reliability Statistics	
Cronbach's Alpha	N of Items
0.929	20

Based on the results of the reliability test of the instrument in Experimental Class 1, the Cronbach's Alpha value was 0.929 with a total of 20 items. According to the reliability criteria, an instrument is considered reliable if it has a Cronbach's Alpha value greater than 0.70. Since the obtained Cronbach's Alpha value of 0.929 exceeds 0.70, it can be concluded that the research instrument has very high reliability. Therefore, the research instrument used in Experimental Class 1 is considered highly reliable and appropriate for use as a data collection tool in this study.

Validity and Reliability Testing of the Motivation Questionnaire for Experimental Class 2

Table 3. Results of the Validity Test of the Motivation Questionnaire for Experimental Class 2

Correlations

		A1	A2	A3	A4	A5	R1	R2	R3	R4	R5	C1	C2	C3	C4	C5	S1	S2	S3	S4	S5	Total2
A1	Pearson Correlation	1	.390*	.504**	.511**	.210	.149	.290	.556**	.236	.552**	.418*	.504**	.624**	.142	.438*	.418*	.094	.024	.109	-.295	.573**
	Sig. (2-tailed)		.036	.005	.005	.275	.441	.127	.002	.218	.002	.024	.005	.000	.461	.017	.024	.626	.900	.573	.121	.001
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A2	Pearson Correlation	.390*	1	.277	.450*	.318	.249	.536**	.515**	.396*	.049	.612**	.527**	.475**	.173	.504**	.365	.052	.211	.122	.165	.640**
	Sig. (2-tailed)	.036		.146	.014	.093	.192	.003	.004	.034	.800	.000	.003	.009	.370	.005	.051	.787	.272	.530	.394	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A3	Pearson Correlation	.504**	.277	1	.021	.043	.574**	.120	.504**	.265	.344	.465*	.358	.542**	.128	.402*	.279	.056	.080	-.019	.024	.490**
	Sig. (2-tailed)	.005	.146		.914	.826	.001	.534	.005	.164	.067	.011	.057	.002	.509	.031	.142	.773	.681	.922	.904	.007
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A4	Pearson Correlation	.511**	.450*	.021	1	.383*	.232	.315	.322	.300	.352	.356	.581**	.315	.419*	.601**	.408*	.194	.320	.224	.311	.683**
	Sig. (2-tailed)	.005	.014	.914		.040	.226	.096	.088	.113	.061	.058	.001	.096	.024	.001	.028	.313	.090	.242	.100	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A5	Pearson Correlation	.210	.318	.043	.383*	1	.076	.151	.119	.293	.244	.292	.498**	.122	.171	.462*	.277	.239	.361	.249	.370*	.548**
	Sig. (2-tailed)	.275	.093	.826	.040		.695	.433	.539	.123	.202	.125	.006	.527	.375	.012	.145	.213	.054	.193	.048	.002
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R1	Pearson Correlation	.149	.249	.574**	.232	.076	1	.241	.306	.430*	.269	.451*	.433*	.431*	.359	.264	.402*	.342	.425*	.210	.368*	.623**
	Sig. (2-tailed)	.441	.192	.001	.226	.695		.207	.107	.020	.158	.014	.019	.020	.056	.167	.030	.069	.021	.274	.050	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R2	Pearson Correlation	.290	.536**	.120	.315	.151	.241	1	.341	.228	.132	.363	.332	.465*	.275	.251	.435*	.296	.438*	.251	.267	.588**
	Sig. (2-tailed)	.127	.003	.534	.096	.433	.207		.070	.233	.495	.053	.079	.011	.149	.189	.018	.118	.017	.190	.162	.001
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R3	Pearson Correlation	.556**	.515**	.504**	.322	.119	.306	.341	1	.202	.148	.607**	.283	.599**	.141	.445*	.560**	.062	-.152	-.021	-.125	.534**
	Sig. (2-tailed)	.002	.004	.005	.088	.539	.107	.070		.294	.443	.000	.137	.001	.465	.016	.002	.750	.432	.914	.519	.003
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R4	Pearson Correlation	.236	.396*	.265	.300	.293	.430*	.228	.202	1	.159	.316	.381*	.306	.008	.514**	.424*	-.064	.305	.040	.191	.523**
	Sig. (2-tailed)	.218	.034	.164	.113	.123	.020	.233	.294		.411	.095	.041	.106	.967	.004	.022	.742	.107	.839	.320	.004
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R5	Pearson Correlation	.552**	.049	.344	.352	.244	.269	.132	.148	.159	1	.209	.370*	.143	.307	.280	-.042	.237	.321	.371*	.139	.476**
	Sig. (2-tailed)	.002	.800	.067	.061	.202	.158	.495	.443	.411		.277	.048	.461	.106	.141	.827	.217	.089	.048	.471	.009
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C1	Pearson Correlation	.418*	.612**	.465*	.356	.292	.451*	.363	.607**	.316	.209	1	.450*	.554**	.451*	.599**	.306	.026	.037	-.118	.074	.636**
	Sig. (2-tailed)	.024	.000	.011	.058	.125	.014	.053	.000	.095	.277		.014	.002	.014	.001	.106	.894	.848	.541	.701	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C2	Pearson Correlation	.504**	.527**	.358	.581**	.498**	.433*	.332	.283	.381*	.370*	.450*	1	.486**	.356	.361	.454*	.395*	.370*	.298	.243	.760**
	Sig. (2-tailed)	.005	.003	.057	.001	.006	.019	.079	.137	.041	.048	.014		.007	.058	.054	.013	.034	.048	.116	.204	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C3	Pearson Correlation	.624**	.475**	.542**	.315	.122	.431*	.465*	.599**	.306	.143	.554**	.486**	1	.177	.360	.664**	.058	.134	.153	-.067	.640**
	Sig. (2-tailed)	.000	.009	.002	.096	.527	.020	.011	.001	.106	.461	.002	.007		.359	.055	.000	.767	.489	.429	.728	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C4	Pearson Correlation	.142	.173	.128	.419*	.171	.359	.275	.141	.008	.307	.451*	.356	.177	1	.299	-.046	.101	.239	.247	.392*	.472**
	Sig. (2-tailed)	.461	.370	.509	.024	.375	.056	.149	.465	.967	.106	.014	.058	.359		.115	.812	.601	.212	.197	.036	.010
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C5	Pearson Correlation	.438*	.504**	.402*	.601**	.462*	.264	.251	.445*	.514**	.280	.599**	.361	.360	.299	1	.404*	.000	.193	.000	.242	.675**
	Sig. (2-tailed)	.017	.005	.031	.001	.012	.167	.189	.016	.004	.141	.001	.054	.055	.115		.030	1.000	.317	1.000	.205	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S1	Pearson Correlation	.418*	.365	.279	.408*	.277	.402*	.435*	.560**	.424*	-.042	.306	.454*	.664**	-.046	.404*	1	.325	.246	.077	-.006	.610**
	Sig. (2-tailed)	.024	.051	.142	.028	.145	.030	.018	.002	.022	.827	.106	.013	.000	.812	.030		.086	.198	.691	.976	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S2	Pearson Correlation	.094	.052	.056	.194	.239	.342	.296	.062	-.064	.237	.026	.395*	.058	.101	.000	.325	1	.522**	.504**	.299	.429*
	Sig. (2-tailed)	.626	.787	.773	.313	.213	.069	.118	.750	.742	.217	.894	.034	.767	.601	1.000	.086		.004	.005	.115	.020
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S3	Pearson Correlation	.024	.211	.080	.320	.361	.425*	.438*	-.152	.305	.321	.037	.370*	.134	.239	.193	.246	.522**	1	.644**	.656**	.591**
	Sig. (2-tailed)	.900	.272	.681	.090	.054	.021	.017	.432	.107	.089	.848	.048	.489	.212	.317	.198	.004		.000	.000	.001
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S4	Pearson Correlation	.109	.122	-.019	.224	.249	.210	.251	-.021	.040	.371*	-.118	.298	.153	.247	.000	.077	.504**	.644**	1	.330	.428*
	Sig. (2-tailed)	.573	.530	.922	.242	.193	.274	.190	.914	.839	.048	.541	.116	.429	.197	1.000	.691	.005	.000		.080	.021
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S5	Pearson Correlation	-.295	.165	.024	.311	.370*	.368*	.267	-.125	.191	.139	.074	.243	-.067	.392*	.242	-.006	.299	.656**	.330	1	.442*
	Sig. (2-tailed)	.121	.394	.904	.100	.048	.050	.162	.519	.320	.471	.701	.204	.728	.036	.205	.976	.115	.000	.080		.016
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Total2	Pearson Correlation	.573**	.640**	.490**	.683**	.548**	.623**	.588**	.534**	.523**	.476**	.636**	.760**	.640**	.472**	.675**	.610**	.429*	.591**	.428*	.442*	1
	Sig. (2-tailed)	.001	.000	.007	.000	.002	.000	.001	.003	.004	.009	.000	.000	.000	.010	.000	.000	.020	.001	.021	.016	
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the results of the instrument validity test in Experimental Class 2 (29 respondents), the r-table value was 0.3673 at the 5% significance level. The results of the Pearson correlation analysis indicated that most items had r-count values greater than the r-table value and were therefore declared valid. For the Attention (A) indicator, which consists of items A1 to A5, the r-count values ranged from 0.490 to 0.683, indicating that all items under this indicator are valid. For the Relevance

(R) indicator, consisting of items R1 to R5, the r-count values ranged from 0.476 to 0.623, all of which exceeded the r-table value; thus, all items were declared valid. Furthermore, for the Confidence (C) indicator, which includes items C1 to C5, the r-count values ranged from 0.472 to 0.760, indicating that all items also met the validity criteria. For the Satisfaction (S) indicator, consisting of items S1 to S5, the r-count values ranged from 0.428 to 0.610. All these values exceed the r-table value; therefore, all items under this indicator were also declared valid. In conclusion, all 20 items of the ARCS motivation instrument in Experimental Class 2 are valid, as they have r-count values greater than the r-table value (0.3673). Therefore, all items of the instrument are appropriate for use.

Table 4. Results of the Reliability Test of the Motivation Questionnaire for Experimental Class 2

Reliability Statistics	
Cronbach's Alpha	N of Items
0.885	20

Based on the results of the reliability test of the instrument in Experimental Class 2, the Cronbach's Alpha value was 0.885 with a total of 20 items. According to the reliability criteria, an instrument is considered reliable if it has a Cronbach's Alpha value greater than 0.70. Since the obtained Cronbach's Alpha value of 0.885 exceeds 0.70, it can be concluded that the research instrument has high reliability. Therefore, the research instrument used in Experimental Class 2 is considered reliable and appropriate.

Validity and Reliability Testing of the Motivation Questionnaire for Experimental Class 3

Table 5. Results of the Validity Test of the Motivation Questionnaire for Experimental Class 3

Correlations

		A1	A2	A3	A4	A5	R1	R2	R3	R4	R5	C1	C2	C3	C4	C5	S1	S2	S3	S4	S5	Total3
A1	Pearson Correlation	1	.744**	.698**	.609**	.683**	.404*	.539**	.461*	.676**	.485**	.813**	.682**	.572**	.608**	.737**	.636**	.728**	.717**	.594**	.565**	.851**
	Sig. (2-tailed)		.000	.000	.000	.000	.030	.003	.012	.000	.008	.000	.000	.001	.000	.000	.000	.000	.000	.001	.001	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A2	Pearson Correlation	.744**	1	.625**	.744**	.739**	.325	.387*	.534**	.674**	.367	.815**	.710**	.555**	.653**	.687**	.708**	.745**	.736**	.444*	.604**	.842**
	Sig. (2-tailed)	.000		.000	.000	.000	.086	.038	.003	.000	.050	.000	.000	.002	.000	.000	.000	.000	.000	.016	.001	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A3	Pearson Correlation	.698**	.625**	1	.627**	.625**	.420*	.708**	.546**	.481**	.553**	.676**	.588**	.550**	.585**	.600**	.544**	.494**	.715**	.762**	.618**	.804**
	Sig. (2-tailed)	.000	.000		.000	.000	.023	.000	.002	.008	.002	.000	.001	.002	.001	.001	.002	.006	.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A4	Pearson Correlation	.609**	.744**	.627**	1	.727**	.292	.532**	.673**	.600**	.530**	.762**	.559**	.532**	.638**	.499**	.726**	.736**	.695**	.368*	.667**	.818**
	Sig. (2-tailed)	.000	.000	.000		.000	.124	.003	.000	.001	.003	.000	.002	.003	.000	.006	.000	.000	.000	.049	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
A5	Pearson Correlation	.683**	.739**	.625**	.727**	1	.358	.302	.679**	.808**	.277	.777**	.539**	.520**	.757**	.704**	.730**	.684**	.697**	.638**	.829**	.861**
	Sig. (2-tailed)	.000	.000	.000	.000		.056	.112	.000	.000	.145	.000	.003	.004	.000	.000	.000	.000	.000	.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R1	Pearson Correlation	.404*	.325	.420*	.292	.358	1	.229	.142	.221	.143	.443*	.387*	.799**	.235	.426*	.403*	.343	.398*	.409*	.265	.511**
	Sig. (2-tailed)	.030	.086	.023	.124	.056		.231	.464	.249	.458	.016	.038	.000	.220	.021	.030	.069	.032	.027	.165	.005
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R2	Pearson Correlation	.539**	.387*	.708**	.532**	.302	.229	1	.429*	.260	.745**	.581**	.450*	.447*	.409*	.436*	.332	.286	.493**	.589**	.444*	.613**
	Sig. (2-tailed)	.003	.038	.000	.003	.112	.231		.020	.173	.000	.001	.014	.015	.028	.018	.078	.133	.007	.001	.016	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R3	Pearson Correlation	.461*	.534**	.546**	.673**	.679**	.142	.429*	1	.631**	.476**	.560**	.396*	.457*	.671**	.543**	.464*	.493**	.494**	.408*	.668**	.696**
	Sig. (2-tailed)	.012	.003	.002	.000	.000	.464	.020		.000	.009	.002	.033	.013	.000	.002	.011	.007	.006	.028	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R4	Pearson Correlation	.676**	.674**	.481**	.600**	.808**	.221	.260	.631**	1	.296	.655**	.445*	.484**	.697**	.675**	.461*	.673**	.615**	.457*	.642**	.754**
	Sig. (2-tailed)	.000	.000	.008	.001	.000	.249	.173	.000		.119	.000	.016	.008	.000	.000	.012	.000	.000	.013	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
R5	Pearson Correlation	.485**	.367	.553**	.530**	.277	.143	.745**	.476**	.296	1	.487**	.393*	.365	.315	.498**	.317	.263	.493**	.512**	.364	.564**
	Sig. (2-tailed)	.008	.050	.002	.003	.145	.458	.000	.009	.119		.007	.035	.052	.096	.006	.094	.168	.007	.004	.052	.001
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C1	Pearson Correlation	.813**	.815**	.676**	.762**	.777**	.443*	.581**	.560**	.655**	.487**	1	.732**	.608**	.646**	.658**	.808**	.698**	.687**	.574**	.691**	.900**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.016	.001	.002	.000	.007		.000	.000	.000	.000	.000	.000	.000	.001	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C2	Pearson Correlation	.682**	.710**	.588**	.559**	.539**	.387*	.450*	.396*	.445*	.393*	.732**	1	.445*	.689**	.533**	.696**	.644**	.734**	.529**	.592**	.775**
	Sig. (2-tailed)	.000	.000	.001	.002	.003	.038	.014	.033	.016	.035	.000		.016	.000	.003	.000	.000	.000	.003	.001	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C3	Pearson Correlation	.572**	.555**	.550**	.532**	.520**	.799**	.447*	.457*	.484**	.365	.608**	.445*	1	.515**	.553**	.461*	.507**	.566**	.457*	.475**	.717**
	Sig. (2-tailed)	.001	.002	.002	.003	.004	.000	.015	.013	.008	.052	.000	.016		.004	.002	.012	.005	.001	.013	.009	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C4	Pearson Correlation	.608**	.653**	.585**	.638**	.757**	.235	.409*	.671**	.697**	.315	.646**	.689**	.515**	1	.587**	.617**	.656**	.759**	.563**	.858**	.817**
	Sig. (2-tailed)	.000	.000	.001	.000	.000	.220	.028	.000	.000	.096	.000	.000	.004		.001	.000	.000	.000	.001	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
C5	Pearson Correlation	.737**	.687**	.600**	.499**	.704**	.426*	.436*	.543**	.675**	.498**	.658**	.533**	.553**	.587**	1	.560**	.682**	.582**	.623**	.548**	.793**
	Sig. (2-tailed)	.000	.000	.001	.006	.000	.021	.018	.002	.000	.006	.000	.003	.002	.001		.002	.000	.001	.000	.002	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S1	Pearson Correlation	.636**	.708**	.544**	.726**	.730**	.403*	.332	.464*	.461*	.317	.808**	.696**	.461*	.617**	.560**	1	.639**	.654**	.469*	.636**	.783**
	Sig. (2-tailed)	.000	.000	.002	.000	.000	.030	.078	.011	.012	.094	.000	.000	.012	.000	.002		.000	.000	.010	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S2	Pearson Correlation	.728**	.745**	.494**	.736**	.684**	.343	.286	.493**	.673**	.263	.698**	.644**	.507**	.656**	.682**	.639**	1	.628**	.314	.501**	.774**
	Sig. (2-tailed)	.000	.000	.006	.000	.000	.069	.133	.007	.000	.168	.000	.000	.005	.000	.000	.000		.000	.097	.006	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S3	Pearson Correlation	.717**	.736**	.715**	.695**	.697**	.398*	.493**	.494**	.615**	.493**	.687**	.734**	.566**	.759**	.582**	.654**	.628**	1	.705**	.745**	.860**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.032	.007	.006	.000	.007	.000	.000	.001	.000	.001	.000	.000		.000	.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S4	Pearson Correlation	.594**	.444*	.762**	.368*	.638**	.409*	.589**	.408*	.457*	.512**	.574**	.529**	.457*	.563**	.623**	.469*	.314	.705**	1	.610**	.715**
	Sig. (2-tailed)	.001	.016	.000	.049	.000	.027	.001	.028	.013	.004	.001	.003	.013	.001	.000	.010	.097	.000		.000	.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
S5	Pearson Correlation	.565**	.604**	.618**	.667**	.829**	.265	.444*	.668**	.642**	.364	.691**	.592**	.475**	.858**	.548**	.636**	.501**	.745**	.610**	1	.808**
	Sig. (2-tailed)	.001	.001	.000	.000	.000	.165	.016	.000	.000	.052	.000	.001	.009	.000	.002	.000	.006	.000	.000		.000
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Total3	Pearson Correlation	.851**	.842**	.804**	.818**	.861**	.511**	.613**	.696**	.754**	.564**	.900**	.775**	.717**	.817**	.793**	.783**	.774**	.860**	.715**	.808**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.005	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Based on the results of the instrument validity test in Experimental Class 3, with 29 respondents, the r-table value was 0.3673 at the 5% significance level. The results of the Pearson correlation analysis indicated that all items had r-count values greater than the r-table value. For the Attention (A) indicator, which consists of items A1 to A5, the r-count values ranged from 0.804 to 0.861, indicating that all items were valid. For the Relevance (R) indicator, consisting of items R1 to R5, the r-count values ranged from 0.511 to 0.754, showing that all items were also valid. Furthermore, for the Confidence (C) indicator, which includes items C1 to C5, the r-count values ranged from 0.717 to 0.900. All these values exceed the r-table value; therefore, all items were declared valid. Similarly, for the Satisfaction (S) indicator, consisting of items S1 to S5, the r-count values ranged from 0.715 to 0.860, indicating that all items met the validity criteria. In conclusion, all 20 items of the ARCS motivation instrument in Experimental Class 3 are valid, as they have r-count values greater than the r-table value (0.3673). Therefore, the instrument is appropriate for use.

Table 6. Results of the Reliability Test of the Motivation Questionnaire for Experimental Class 2

Reliability Statistics	
Cronbach's Alpha	N of Items
0.961	20

Based on the results of the reliability test of the instrument in Experimental Class 3, the Cronbach's Alpha value was 0.961 with a total of 20 items. According to the reliability criteria, an instrument is considered reliable if it has a Cronbach's Alpha value greater than 0.70. Since the obtained Cronbach's Alpha value of 0.961 exceeds 0.70, it can be concluded that the research instrument has very high reliability. Therefore, the research instrument is considered highly reliable and appropriate for use.

This study employed both descriptive and inferential statistical analyses in processing the data. Prior to conducting inferential analysis, the data were first subjected to normality and homogeneity tests to ensure that the statistical assumptions were met. Subsequently, hypothesis testing was carried out using the ANCOVA (Analysis of Covariance) test to determine differences among the research groups. If a significant difference was identified, the analysis was followed by a Least Significant Difference (LSD) post hoc test. All data processing procedures were conducted using Statistical Product and Service Solutions (SPSS) software at a significance level of 0.05.

RESEARCH RESULTS AND DISCUSSION

The research findings were obtained based on a learning motivation questionnaire used to measure students' motivation levels. The measurement was conducted in two stages: pretest and posttest, as presented in Table 7.

Table 7. Pretest and Posttest Data Analysis

Data	Pre-test value			Post-test value		
	Experimental class 1	Experimental class 2	Experimental class 3	Experimental class 1	Experimental class 2	Experimental class 3
Mean	68.34	67.64	66.96	84.59	86.00	88.07
Minimum score	60	60	60	72	76	75
Maximum score	75	79	76	99	100	100
Standard deviation	4.270	4.236	4.256	6.138	7.237	6.685

The subsequent stage involved conducting prerequisite tests, including tests for normality and homogeneity. The results of the normality test are presented in Table 8, while the results of the homogeneity test for the three experimental groups are shown in Table 9. If all prerequisite assumptions are satisfied, the analysis proceeds to the hypothesis testing stage.

Table 8. Normality Test Result

Variable		Class	Sig.	Description
Students' Learning Motivation	*Pretest*	Collaboration of the Pomodoro Technique and Qur'anic Murottal Recitation (Experimental Class 1)	0.106	Normal
		Pomodoro Technique (Experimental Class 2)	0.473	Normal
		Qur'anic Murottal Recitation (Experimental Class 3)	0.683	Normal

	Posttest	Collaboration of the Pomodoro Technique and Qur'anic Murottal Recitation (Experimental Class 1)	0.066	Normal
		Pomodoro Technique (Experimental Class 2)	0.122	Normal
		Qur'anic Murottal Recitation (Experimental Class 3)	0.466	Normal

Table 8 presents the results of the normality test for students' learning motivation data using the Shapiro–Wilk test. The results indicate that prior to the treatment (pretest), the significance values for students' learning motivation were 0.106 for Experimental Class 1, 0.473 for Experimental Class 2, and 0.683 for Experimental Class 3.

After the treatment (posttest), the significance values were 0.066, 0.122, and 0.466 for Experimental Class 1, Experimental Class 2, and Experimental Class 3, respectively. All significance values were greater than 0.05 (sig. > 0.05). Therefore, it can be concluded that the learning motivation data for all three experimental groups were normally distributed and met the prerequisite assumptions for further analysis.

Table 9. Homogeneity Test Result

Variable			Sig.	Description
Students' Motivation	Learning	*Pretest*	0.911	Homogen
Students' Motivation	Learning	*Posttest*	0.295	Homogen

Table 9 presents the results of the homogeneity of variance test using Levene's Statistic for the three research variables. Prior to the treatment (pretest), the significance values obtained were 0.911 for the learning motivation variable, 0.619 for the learning activity variable, and 0.070 for the learning outcomes variable.

After the treatment (posttest), the significance values were 0.295 for the learning motivation variable, 0.230 for the learning activity variable, and 0.981 for the learning outcomes variable.

Since all significance values exceeded 0.05, the assumption of homogeneity of variances was satisfied. Therefore, hypothesis testing could proceed to evaluate and analyze the implementation of the collaboration between the Pomodoro Technique and Qur'anic *murottal* recitation, the Pomodoro Technique alone, and Qur'anic *murottal* recitation alone. The results of the ANCOVA test on the learning motivation of eleventh-grade students at MA Madani Alauddin are presented in Table 5.

Table 10. Results of the ANCOVA Test on Students' Learning Motivation

Source	Type III Sum of Squares	Db	Mean Square	F	Sig.
Corrected Model	436.379[a]	3	145.460	3.457	0.020
Intercept	1053.557	1	1053.557	25.040	0.000
Pretest	264.944	1	264.944	6.297	0.014
Class	229.276	2	114.638	2.725	0.072
Error	3365.942	80	42.074		
Total	627649.000	84			
Corrected Total	3802.321	83			

Table 10 presents the results of the ANCOVA test, indicating that the test of between-subject effects for the class factor yielded an F value of 2.725 with a significance value of 0.072 > 0.05; therefore, H_0 was accepted. This finding demonstrates that class differences had no statistically significant effect on students' learning motivation after controlling for initial motivation. These results suggest that the implementation of the collaboration between the Pomodoro Technique and Qur'anic *murottal* recitation, the Pomodoro Technique alone, and Qur'anic *murottal* recitation alone did not produce a statistically significant difference in students' learning motivation. Consequently, no further post hoc analysis was required.

The Hierarchy of Needs proposed by Maslow explains that an individual's motivation is optimally fulfilled when fundamental psychological needs, such as safety, comfort, and emotional stability, are met.[22] In the context of the Pomodoro Technique, the improvement in students' learning motivation may be understood as a response to a more structured, calming, and meaningful learning environment. Meanwhile, the implementation of Qur'anic *murottal* recitation was found to have the greatest impact on students' learning motivation.

The implementation of the collaborative Pomodoro Technique and Qur'anic *murottal* recitation represents an integration of a time-management strategy with an affective-spiritual approach. The Pomodoro Technique assists students in learning through structured intervals of focused study and scheduled breaks, thereby minimizing boredom and mental fatigue. This technique trains students to regulate their study time systematically by dividing learning sessions into focused periods followed by regular rest intervals. According to Cirillo (2018), the Pomodoro Technique embodies a philosophy of mindful work that views time as a limited resource requiring wise utilization. He emphasizes that this method helps individuals become more responsible in managing their time, reducing stress and work-related pressure, and enhancing overall quality of life and satisfaction in their work. Thus, the Pomodoro Technique is not merely a time-management tool, but also a means of transforming one's perspective on time, work, and life.[23]

The implementation of the Pomodoro Technique also positively impacts learning motivation. This is consistent with the Goal-Setting Theory proposed by Edwin A. Locke and Gary P. Latham, which posits that specific, clear, and realistic goals can enhance individuals' motivation and performance.[24] By dividing study time into short and measurable intervals, students are provided with attainable short-term goals, thereby fostering greater consistency and sustained enthusiasm in learning.

The Attention Span Theory in cognitive psychology explains that students' attentional capacity is limited and tends to decline when learning sessions are prolonged without intermittent

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breaks.[25] Therefore, well-planned, periodic intervals are essential to maintain concentration and prevent cognitive fatigue.[26] In this regard, the Pomodoro Technique offers a practical solution by regulating study and rest periods in a balanced manner. This structured pattern enables students to sustain focus and reduce boredom, thereby making the learning process feel lighter, more organized, and more conducive to enhancing learning motivation.

Meanwhile, the implementation of Qur'anic *murottal* recitation was found to have the greatest impact on students' learning motivation. Playing Qur'anic *murottal* recitation during intervals in the learning process serves as a relaxation stimulus, helping calm students' minds and emotions. This finding is consistent with Safitri's (2022) study, which reported that listening to Qur'anic *murottal* recitation produces a relaxation effect, thereby positively influencing students' mental readiness and enhancing their learning motivation.[27] When emotional conditions are more stable and concentration is maintained, students can process information more optimally and deeply. Such conditions support the achievement of the planned learning objectives.

The Affective Filter Hypothesis proposed by Stephen Krashen posits that emotional factors such as anxiety, stress, and discomfort can hinder learning. Conversely, a conducive and enjoyable learning environment can lower the affective filter, thereby enabling students to receive and process information more effectively. In this context, listening to Qur'anic *murottal* recitation has been shown to reduce anxiety and promote a sense of calm, ultimately enhancing students' learning motivation.[28]

The ANCOVA results indicate that differences in learning motivation among the three classes were not statistically significant. This finding suggests that although there were variations in the adjusted mean scores, all treatments demonstrated relatively comparable effectiveness in improving students' learning motivation. The collaboration between the Pomodoro Technique and Qur'anic *murottal* recitation still provided a positive contribution, particularly in integrating time management with spiritual calmness. However, in its implementation, Qur'anic *murottal* recitation alone appeared to be more prominent in influencing the affective aspects directly associated with students' learning motivation.

Based on the explanation above, the lack of significant differences among the three classes may be due to the school background and the students' characteristics. This study was conducted at MA Madani Alauddin, which has a strong academic and religious atmosphere. Islamic values are not only integrated into specific subjects but are also embedded in students' daily routines within the school environment. Activities such as Qur'anic recitation, habitual worship practices, and the

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reinforcement of spiritual character have become part of the school's routine. In addition, MA Madani Alauddin fosters a strong learning culture. The school environment tends to be orderly, disciplinary practices are well established, and religious values are deeply integrated into the daily lives of the students.

These conditions make students feel familiar with a learning environment characterized by religious nuances. This is consistent with the study by Erlanda et al. (2021), which found that a consistently maintained environment shapes a distinctive madrasa climate. The integration of religious values into the learning process becomes part of students' daily habits.[29] Similarly, the study by Suriyani and Desi (2023) indicates that social support and a stable religious atmosphere in the madrasa foster students' mental readiness to engage in academic activities. Therefore, when Qur'anic *murottal* is played during the learning process, students tend to perceive it as something natural and familiar.[30] This condition allows the treatment effect to be relatively uniform across classes, as all students are situated within the same environment that provides both spiritual and emotional support.

In contrast, the characteristics of students from the three Grade XI classes selected as research samples also exhibited relatively similar tendencies. Based on observations conducted over four learning sessions, students in Experimental Classes 1, 2, and 3 were equally active and enthusiastic. They engaged in discussions, responded well to teachers' questions, and demonstrated seriousness in completing assigned tasks. This situation indicates that, from the first meeting, they already possessed a relatively strong level of learning motivation. This finding is consistent with the study conducted by Wahyuningsih et al. (2025), which suggests that a conducive spiritual atmosphere, accompanied by inner calm developed through repeated religious practices, can help reduce stress levels while enhancing students' focus in completing various academic tasks.[31]

Therefore, when students' initial motivation is already relatively strong, the improvement observed after the treatment tends not to differ substantially among the groups. In other words, all three treatments were applied to students who already possessed a high level of learning motivation. This, in fact, indicates that all three instructional strategies are equally capable of supporting students' learning motivation. This may explain why no statistically significant differences were found.

CONCLUSION

Based on the research findings, there was an increase in students' mean learning motivation scores across all three classes after the treatments were administered, including the class that received the collaboration of the Pomodoro Technique and Qur'anic *murottal* recitation, the Pomodoro Technique class, and the Qur'anic *murottal* recitation class. The prerequisite test results indicated that the data were normally distributed and homogeneous, allowing the ANCOVA to proceed. However, the ANCOVA results revealed that differences in learning motivation across classes were not

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statistically significant after controlling for initial motivation. This implies that the three treatments demonstrated relatively comparable effectiveness in enhancing students' learning motivation.

Based on the study's results, several recommendations can be proposed. Future research is expected to implement the Pomodoro technique and Qur'anic *murottal* in a wider range of schools and across different educational levels to obtain more comprehensive findings. In addition, its application can be extended to other Biology topics or different subjects to examine the consistency of its effects. Future studies are also recommended to investigate other variables, such as learning concentration, time management, and students' affective and spiritual aspects, to gain a deeper understanding of the impact of this instructional strategy.

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