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The Effects of Flashcards and Handouts as Review Methods on Students' Test Score

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Abstract

This experimental study examined the effectiveness of two review methods—flashcards and handouts—on students' test scores. Thirty undergraduate students aged 18–21 were randomly assigned to two independent groups, with one group reviewing a standardized set of flashcards and the other reviewing an equivalent set of handouts containing identical lesson content. Both groups were given 20 minutes to study their assigned materials under controlled conditions, followed by the same 20-item test covering topics in Philippine history, world history, science, and culture. Descriptive statistics and the Shapiro–Wilk test indicated that the data were non-normal, prompting the use of the Mann–Whitney U test for group comparison. Results showed no significant difference in test scores between the flashcard group and the handout group, with a very small effect size. These findings suggest that both review methods are similarly effective in supporting short-term knowledge retention. The results align with Retrieval Practice Theory, indicating that active engagement with study materials—regardless of format—may play a more influential than the review method itself. The study recommends continued use of both flashcards and handouts in academic settings and encourages future research involving larger samples, more complex assessments, and longer retention intervals.

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1. Introduction

In the quest to improve student achievement, educators and researchers worldwide have increasingly focused on which review or study methods best enhance test performance and long-term retention. A previous study explains that the use of flashcards is not only an alternative tool, but also an effective learning tool to improve various aspects of language skills, including vocabulary expansion, listening skills, and speaking skills [1]. With flashcards as learning tools, teachers can create an interactive and engaging learning environment where students can actively participate in the process of instructing and learning. Moreover, it was demonstrated that written material enhances retention and promotes improved treatment adherence [2]. Fourteen patients' knowledge retention has been demonstrated to be enhanced by tools like pamphlets, multimedia, and web-based interactive media. Among these methods, flashcards (which promote active recall) and handouts (which often provide structured outlines or summaries) are commonly used, yet empirical comparisons between them remain somewhat limited, particularly in recent years and in certain educational contexts. Globally, studies have continued to affirm the benefits of methods that engage students actively in reviewing material. Previous research studied health sciences students learning anatomy and found that those who used flashcards performed better on both immediate and delayed tests compared to students using handouts, indicating that retrieval practice can effectively strengthen memory and support learning of complex material [3]. In addition, one technique that is frequently employed to enhance ELT capabilities is the application of flashcards. After that, the student attempts to recall the translation by examining the foreign term [4]. Also, digital flashcards allow language teachers to design specific content and activities that promote learners' autonomous study and strengthen their vocabulary knowledge [5]. Furthermore, the use of online handouts supports students in acquiring additional information, which enhances their understanding of the subject matter [6].

Also, it was highlighted that handouts serve as a key resource, offering important background information that supports the development of critical thinking skills [7]. In Asia, in actual classroom use, flashcards help students learn new vocabulary and strengthen their communication skills. Previous studies have also shown that flashcards are one of the most effective methods for improving vocabulary development in online ESL courses for intermediate learners [8]. Asian universities are also increasingly exploring digital tools, such as flashcard applications, as supplemental learning aids [9]. This reflects a broader shift from rote-based study habits to active, technology-enhanced learning strategies across the region. In a classroom action research study, employed flashcards to capture the problem, they showed that employing flashcards helped students become more proficient in learning the simple present tense [10]. Numerous studies have been carried out to investigate how well flashcard media can improve elementary school students' learning outcomes in Indonesia; it was discovered that using flashcards could greatly enhance pupils' capacity to commit new vocabulary to memory [11]. Furthermore, according to other studies, flashcards boost students' motivation to learn and by enabling them to participate more actively in the learning process [12].

Locally, students use flashcard drills to repeatedly practice specific skills until they can answer independently [13]. During practice, a flashcard is shown, students respond, and the teacher gives feedback, which helps improve accuracy and fluency. In addition, it was stated that flashcards are an affordable and simple learning tool that can be applied in various educational settings while still ensuring effective instruction [14]. Their accessibility makes them especially valuable for rural schools that may not have the resources for costly technological interventions. Furthermore, a study emphasized that instructional materials are essential because they shape classroom learning and contribute to students' academic outcomes [15]. Also, using instructional materials creates a more effective teaching and learning process. They allow teachers to present lessons more clearly and efficiently, while enabling students to gain deeper understanding and learn more effectively [16].

Despite these findings, several gaps persist. Many comparative studies focus on very specific content domains (anatomy, vocabulary, languages) and may not generalize to other disciplines (e.g., quantitative subjects, technical/vocational education) Also, although many studies have explored how review tools like flashcards and handouts influence students' learning outcomes, most were carried out in international settings. Most were conducted abroad, leaving limited understanding of how these review methods affect test performance in local Catholic institutions, especially among college students. Thus, there is a lack of research comparing these methods among Filipino college students, especially in Catholic institutions.

This study is conducted to determine which of the two review methods is more effective in retaining lessons. It aimed to examine how the use of flashcards and handouts help students improve their test scores. This study was conducted at a Psychology Laboratory during the First Semester of Academic Year 2025–2026 to determine which of the two review methods, flashcards or handouts, is more effective in helping college students retain lessons and improve test scores. It aimed to find out how these tools influenced learning outcomes by comparing their effects on students' scores after a review session. The study was conducted because there was limited research within local Catholic institutions on effective review strategies, and the findings were expected to help improve study habits among Filipino college students.

2. Theoretical Framework

This study is grounded in Retrieval Practice Theory. This framework offers a strong theoretical basis for examining how different review methods, specifically flashcards and handouts, affect students' test scores. Retrieval Practice Theory by Henry L. Roediger III and Jeffrey D. Karpicke (2008) asserts that memory is strengthened when learners actively attempt to recall information rather than passively reread or review it [17]. Flashcards are a classic application of this principle because they encourage learners to retrieve knowledge from memory with minimal cues. Research has consistently shown that retrieval practice produces more durable learning than restudying, especially when applied over time [18].

3. Methods

3.1. Research Design

This study used an experimental design, specifically, a two independent experimental groups design, to determine the effect of the review method on students' test scores. The independent variable of this study was the type of review method, specifically flashcards and handouts, while the dependent variable was the students' test scores as measured through standardized tests that were developed based on the lesson content covered in flashcards and handouts. The test consisted of multiple-choice and short-answer questions aligned with the learning objectives. All participants took the same test under identical conditions, making the results comparable across groups. Moderating variables such as learning styles and student engagement might have influenced the strength of the relationship, while intervening variables like recall and motivation could have affected how the review method impacted performance. Confounding variables, including prior knowledge and study habits, were minimized by ensuring that all participants were exposed to the same lesson content before the review activity.

3.2. Participants

The participants of this study were thirty (30) undergraduate students, aged 18 to 21, consisting of both males and females. The experimental methodologies required at least 15 participants [19], and there were at least 15 participants in both the control and experimental groups for comparison [20]. To ensure representation from various fields, the participants were selected from four different departments.

3.3. Research Instruments

The primary materials used in this study were flashcards and handouts, which served as the review methods for the two independent groups. The flashcards contained one question and answer per card, presented in identification format. These were designed to be short and concise, making them suitable for quick review and active recall. On the other hand, the handouts presented the same content in a more detailed and structured format. Writing materials such as pens, pencils, and bond paper were used during the testing phase. The test consisted of a 20-item multiple-choice questionnaire based on the flashcards and handouts provided, ensuring consistency in the content reviewed and assessed. It covered

general knowledge topics such as Philippine history, world history, science, culture, and traditions.

3.4. Data Collection Procedure

The participants were gathered through random selection from four different departments to ensure fair representation. Upon arrival, they signed the attendance sheet to confirm participation, were oriented about the study's purpose and procedures, and then signed and returned their informed consent forms to confirm voluntary involvement. Once consent was obtained, participants were divided into two independent groups by alternately counting them as 1 and 2, with those labeled "1" assigned to the flashcard group and those labeled "2" assigned to the handout group. The flashcard group received flashcards, while the handout group received handouts, both containing the same lesson content. Each group was given clear instructions and equal time to review their materials in a quiet classroom environment to ensure fairness and uniformity. The review sessions were conducted simultaneously in different rooms, after which all participants took a standardized test in the psychology laboratory under controlled conditions. A timer monitored the 20-minute review and testing period, and prepared answer keys and spreadsheets ensured accurate checking and recording of scores. After completing the test, participants were thanked and debriefed about the study's purpose and the value of their participation, and the recorded data were analyzed statistically to determine whether a significant difference existed in test scores between the flashcard and handout groups.

3.5. Data Analysis

The data collected from the achievement test were thoroughly checked and encoded to ensure accuracy. Descriptive statistics, including the mean and standard deviation, were calculated to summarize the test scores of both groups. Before conducting the t-test, the researchers used the Shapiro–Wilk test to assess data normality. To determine whether a significant difference existed between the scores of students who reviewed using flashcards and those who used handouts, an independent sample t-test was conducted. A significance level of 0.05 was used, and all analyses were performed using statistical software.

4. Results and Discussion

4.1. Descriptive Statistics

Table 1 presents the descriptive statistics for the two experimental groups. Experimental group 1 had a mean score of (M = 19.87, SD = 0.352), while Experimental Group 2 recorded a slightly higher mean of (M = 19.93, SD = 0.258). The Shapiro–Wilk test was conducted to examine the normality of the data distributions. The results showed Shapiro–Wilk values of 0.413 for Experimental Group 1 and 0.284 for Experimental Group 2, both with p-values less than .001. Since the p-values are below the .05 significance level, the data for both groups deviate significantly from a normal distribution.

Since the p-values of the Shapiro-Wilk test are less than .05 this means that the scores in each group are not normally distributed. In other words, the data deviate significantly from a normal pattern. This indicates that the distribution of scores in both experimental groups is significantly different from a normal distribution. Therefore, non-parametric statistical tests are more appropriate for comparing the two groups, as the data do not satisfy the normality assumption.

The non-normality may be due to natural variations in students' performance and learning styles. Differences in study habits or prior knowledge could have caused slight deviations from a normal pattern. This indicates that both flashcards and handouts led to similar levels of knowledge retention. Any difference in scores is so small that it has no practical importance. The material type itself did not meaningfully affect learning outcomes. This suggests several plausible influences—students' prior knowledge, study habits or personal study routines, motivation or commitment level, students who found the content easy, and small sample size, lowering statistical power—these factors may have played a larger role in performance than the specific learning tool used.

This finding is consistent with research showing that differences in learning styles, instructional approaches, and assessment structures can lead to uneven or skewed score patterns [21]. Variations in students' prior knowledge have also been shown to influence assessment outcomes, contributing to inconsistencies in score distributions [22]. Studies examining educational datasets report that violations of normality are common due to natural clustering and skewness, especially in small classroom samples [23]. This set of evidence leads to important implications in the educational field, emphasizing the need to teach and implement effective learning strategies in real school contexts as well [24]. Traditionally, the goal of assessments was to provide a standardized and objective judgement when testing a student's knowledge at a specific point in time [25].

Since the Shapiro–Wilk test revealed that both groups' scores significantly deviate from a normal distribution, future researchers are encouraged to further investigate the factors that may be contributing to this variability. Future researchers are advised to apply non-parametric tests when data do not meet normality assumptions [26], as these approaches yield more reliable results and align with recommendations highlighting the importance of considering statistical assumptions in analysis [27]. Additionally, Increasing the sample size improves accuracy and reduces variance in effect sizes [28]; along with standardizing instructional conditions and examining variables that may influence variability, these strategies can help produce more stable score distributions and improve the suitability of statistical procedures in similar research contexts. Since no significant performance differences were found, educators and students can choose methods based on preference, convenience, or learning style rather than expected test results, as customizing virtual learning environments to fit individual needs has been shown to increase student motivation and satisfaction [29].

Table 1: Descriptive Statistics

	Score	
	Exp 1	**Exp 2**
Mean	19.87	19.93
SD	0.352	0.258
Shapiro-Wilk	0.413	0.284
P-value of Shapiro-Wilk	< .001	< .001

The result of Lavene's Test of Equality for Variances showed that the assumptions of equal variances were met, F(1, 28)= 1.463, p= .237. Since the p-value (.237) is greater than the significance level of .05, we fail to reject the null hypothesis, which states the variances of the two groups are equal.

This indicates that the scores in both groups have homogeneous variances, meaning the variability of scores is similar. However, because the data are non-normal, this test serves only as a secondary check and does not influence the main analysis of group differences.

Table 2: Test of Equality of Variances (Levene's)

	F	df_1	df_2	p
Score	1.463	1	28	.237

Table 3 presents the results of the Mann-Whitney U test comparing the scores of the two experimental groups. The test yielded a U value of 105.0 with a corresponding p-value of .577, indicating that there was no significant difference between the two groups. The rank-biserial correlation, representing the effect size was 0.067 with a standard error of 0.211, indicating that which group a participant was in had little to no effect on their scores.

The Mann-Whitney U test showed that there was no significant difference between the scores of the two experimental groups ($p>.05$). This means that using handouts or flashcards did not significantly affect knowledge retention. The effect size was very small, which also shows that the difference between the groups was practically minimal. Overall, both types of review materials (flashcards and handouts) appeared to be similarly effective.

Some students might have different study routines or commitment levels regardless of the material used, and could have entered the experiment with different baseline knowledge of the topic. The lesson content and the test may have been too easy to generate a different outcome between the two groups. Outliers may include students who already understood the material well. Given that this experiment only used a small sample size, this may reduce the statistical power, making it harder to detect true differences even if they exist. The Mann–Whitney U test showed no significant difference between the test scores of the flashcard and handout groups ($U = 105.0$, $p = .577$), indicating that both review methods produced comparable performance. The small effect size (rank-biserial correlation = 0.067) suggests minimal practical impact of the review material on test scores. Thus, flashcards and handouts appear equally effective for knowledge retention, allowing educators to choose based on convenience or preference. The findings also imply that factors like learning style, motivation, or study habits may influence performance more than the review method itself.

Existing literature provides additional evidence on this topic. It was also found that there was no significant difference between paper and digital flashcards for vocabulary learning [30]. Similarly, it was noted that while flashcard users performed better, only one-third of participants used them, suggesting variability in effectiveness [31]. It was found that participation in flashcard sessions was voluntary, with only 66 out of 202 students participating, highlighting how individual factors like motivation and study preferences may influence outcomes more than the material format itself [32]. Furthermore, it was highlighted that user-generated flashcards might offer a slight advantage, indicating that the method of creating study materials could matter more than the format itself [33]. These studies collectively suggest that learning outcomes depend on multiple factors beyond just the review material, including student engagement, study habits, and personal learning styles.

Based on the findings, which indicated no significant difference between the test scores of students who used flashcards and those who used handouts, it is recommended that adapting teaching methods to meet diverse student needs, aligning with the concept of allowing students to choose review methods that suit their individual learning preferences [34]. Since both materials produced comparable outcomes, the focus should be on promoting retrieval-based learning strategies, which are highly effective in strengthening memory and comprehension [35]. Educators can strengthen student learning by incorporating activities that encourage active recall, such as quizzes or guided questioning, regardless of using flashcards or handouts. Research indicates that methods like flashcards, self-testing, retrieval practice, and concept mapping effectively enhance both academic performance and self-efficacy [36]. Additionally, because the results suggest that factors such as study habits, motivation, and prior knowledge may influence performance more than the review format itself, interventions aimed at improving students' study routines and engagement are encouraged. Future research should also consider using larger and more diverse samples to better determine whether meaningful differences exist across groups. Moreover, exploring enhanced or interactive review materials such as digital flashcard applications or collaborative handouts may provide further insight into strategies that could yield greater improvements in student learning. Recent evidence shows that using digital flashcards can significantly enhance student engagement and improve learning outcomes in academic vocabulary [37].

Table 3: Independent Samples T-Test

	U	df	p	Rank-Biserial Correlation	SE Rank-Biserial Correlation
Score	105.0		.577	0.067	0.211

The results of the study align with Retrieval Practice Theory, which emphasizes that learning improves when students actively recall information from memory. Although flashcards are traditionally associated with retrieval practice, the comparable performance of both groups suggests that students using handouts may have also engaged in retrieval processes, such as self-testing or recalling information before rereading. Because both groups likely used retrieval-based strategies, their similar test scores reflect the theory's prediction that active recall—regardless of the material's format—enhances learning. Thus, the findings support the idea that what matters most is the retrieval process itself, not the specific type of review material used.

5. Conclusion

The study concluded that both flashcards and handouts are effective tools for learning and remembering history and general knowledge, as there was no significant difference in test scores between the two groups. This supports Retrieval Practice Theory, which emphasizes that actively recalling information improves learning regardless of the material's format. The findings suggest that students' engagement, attention, and effort are more important than the type of review material used. Both flashcards and handouts allowed students to interact with the content and retain information effectively.

Therefore, teachers can use either method confidently while focusing on strategies that promote active student participation.

6. Limitations of the Findings

This study is confined to one institution and involves participants from various year levels. It only examines flashcards and handouts and has a short intervention period that may not capture long-term effects. Furthermore, the study does not control for students' intelligence quotient, prior knowledge, motivation, learning styles, or external study habits. The test may have limitations in construction or grading.

7. Practical Value of the Paper

The findings of this study highlight the importance of effective review practices in promoting academic success and have practical implications for educators, students, academic institutions, and researchers. Schools can use the results to adopt the most effective review methods, such as flashcards or structured handouts, to enhance student performance, while students can apply these methods to improve retention, test readiness, and study habits. Teachers and guidance counselors can design activities and workshops based on the findings to support learning outcomes, and academic administrators can integrate proven review tools into instruction and programs. Additionally, the study provides a foundation for future research on learning strategies, review tools, and digital learning environments.

8. Directions for Future Research

For future research, it is suggested to conduct studies with larger sample sizes, longer and more challenging tests, varied subjects, and additional variables such as motivation, prior knowledge, and learning styles; exploring digital and interactive versions of flashcards and handouts may also offer insights into how technology can further enhance students' study practices and overall academic performance. A pretest–posttest design may also be appropriate, as it allows for the comparison of students' scores before and after the review approach. This method can empirically determine whether the review strategies have a measurable effect on students' test performance.

9. Declaration of Conflict of Interest

No potential conflicts of interest relating to the research, writing, or publishing of this work were disclosed by the authors, according to their report.

10. References

1. Sari S, Tarihoran NA. The use of flashcards and its effectiveness in ELT: a systematic review. JPK. 2024;2(7):884–97. Available from: https://jpk.joln.org/index.php/2/article/view/232
2. Koong JK, Rajandram R, Sidambram N, Narayanan V. The effectiveness of handout-assisted versus verbal consent on post-operative recall and understanding – a randomized control study. Surgeon. 2022;20(3):169–76. doi:10.1016/j.surge.2021.04.002
3. Maxson AK, Boyd AT, Gothard MD, Rhodes DCJ. Assessing the effect of restudying anatomy with flashcards versus handouts. FASEB J. 2022;36 Suppl 1. doi:10.1096/fasebj.2022.36.S1.R2685
4. Yowaboot C, Sukying A. Using digital flashcards to enhance Thai EFL primary school students' vocabulary knowledge. English Lang Teach. 2022;15(7):61. doi:10.5539/elt.v15n7p61
5. Yüksel HG, Mercanoğlu HG, Yılmaz MB. Digital flashcards vs. wordlists for learning technical vocabulary. Comput Assist Lang Learn. 2020;35(8):2001–17. doi:10.1080/09588221.2020.1854312
6. Alhefnawi MA. Assessing the efficacy of online handouts and active lectures in learning outcomes at the engineering undergraduate level. Ain Shams Eng J. 2021;12(3):3375–80. doi:10.1016/j.asej.2021.02.012
7. Chacon JA, Janssen H. Teaching critical thinking and problem-solving skills to healthcare professionals. Med Sci Educ. 2021;31(1):235–9. doi:10.1007/s40670-020-01128-3
8. Dineshika HKP, Jayasinghe D. The effectiveness of flashcards in vocabulary instruction. IJRISS. 2024;8(10):1626–34. doi:10.47772/IJRISS.2024.8100141
9. Zung I. How do college students use digital flashcards during self-regulated learning? J Cogn Psychol. 2022;34(6):730–44. doi:10.1080/09658211.2022.2058553
10. Sartika M. Increasing third grade mastery of simple present tense using flashcards. JET. 2020;6(1):40–9. doi:10.33541/jet.v6i1.1293
11. Putri FAK, Sorohiti M, Ariebowo T. Teaching English using flashcards to improve elementary school students' vocabulary. JFLTL. 2023;8(2):198–215. doi:10.18196/ftl.v8i2.21350
12. Subhan M, Nanda DW, Alysa F. The development of flash card learning media. TOFEDU. 2024;3(3):754–62. doi:10.61445/tofedu.v3i3.162
13. Canuto-Penrad J. Effects of innovated flashcard drills [dissertation]. Baguio: University of Baguio; 2020. Available from: https://www.researchgate.net/publication/240523460
14. De Vera JAO, De Vera CMC. Enhancing mathematical performance through flash card implementation. DRJ. 2025;16(1):303. doi:10.59120/drj.v16i1.303
15. Baan P. Development of instructional material for practical research. Int J Interdiscip Stud. 2021;2(4):101–18. doi:10.51798/sijis.v2i4.146
16. Tolentino JCG, Danganan CG, David AA, Peña JT. Development and validation of a booklet in educational research: a supplementary material for Filipino teacher education students. Multidiscip J Educ Soc Technol Sci. 2023;10(2):1–23. doi:10.4995/muse.2023.18678
17. Karpicke JD, Roediger HL 3rd. The critical importance of retrieval for learning. Science. 2008;319(5865):966–8. doi:10.1126/science.1152408
18. Weinstein Y, Sumeracki MA, Caviglioli O. Understanding how we learn: a visual guide. London: Routledge; 2023. doi:10.4324/9780203710463
19. Cohen L, Manion L, Morrison K. Research methods in education. 6th ed. London: Routledge; 2007.
20. Gall MD, Borg WR, Gall JP. Educational research: an introduction. 6th ed. New York: Longman Publishing; 1996.
21. Maya J, Luesia JF, Pérez-Padilla J. The relationship between learning styles and academic performance: consistency among multiple assessment methods in psychology and education students. Sustainability

(Basel). 2021;13(6):3341. doi:10.3390/su13063341
22. McCarthy KS, Steinberg J, Dreier K, O'Reilly T, Sabatini J, Butterfuss R, *et al*. The effects of prior knowledge in a scenario-based comprehension assessment: a multidimensional approach. Learn Individ Differ. 2023;103:102283. doi:10.1016/j.lindif.2023.102283
23. Mukherjee H, Bhonge P. Assessing skew normality in marks distribution, a comparative analysis of Shapiro Wilk tests. arXiv preprint. 2025:2501.14845. doi:10.48550/arXiv.2501.14845
24. Singh J, Agarwal T, editors. Creating an equitable space for teaching and learning: towards theory and evidence-based practice. London: Taylor & Francis; 2023. doi:10.4324/9781003407478
25. Brown GT. The past, present and future of educational assessment: a transdisciplinary perspective. Front Educ. 2022;7:1060633. doi:10.3389/feduc.2022.1060633
26. Sampaio NAS, Mazza FC, de Siqueira SSS, Junior JEM, de Abreu LD, De Lima RM. Application of the non-parametric signals test to a company. Rev Gest Soc Ambient. 2024;18(2):e071. doi:10.24857/rgsa.v18n2-071
27. Gerald B, Patson TF. Parametric and nonparametric tests: a brief review. Int J Stat Distrib Appl. 2021;7(3):78. doi:10.11648/J.IJSD.20210703.12
28. Rajput D, Wang WJ, Chen CC. Evaluation of a decided sample size in machine learning applications. BMC Bioinformatics. 2023;24(1):48. doi:10.1186/s12859-023-05156-9
29. Hasibuan MS, Abdul Aziz RZ, Dewi DA, Kurniawan TB, Syafira NA. Recommendation model for learning material using the Felder Silverman learning style approach. HighTech Innov J. 2023;4(4):811–20. doi:10.28991/hij-2023-04-04-010
30. Hidayat AW, Sahuddin S, Melani BZ, Lestari YB. A comparative study on the use of paper-based and digital flashcards as media to learn vocabulary at the first-grade students of senior high school in the academic year 2024/2025. J English Educ Forum (JEEF). 2025;5(1):7–10. doi:10.29303/jeef.v5i1.810
31. Ingebrigtsen M, Miland ÅO, Bastesen J, Sæle RG. Effective, scalable, and low cost: the use of teacher-made digital flashcards improves student learning. Appl Cogn Psychol. 2025;39(4):e70086. doi:10.1002/acp.70086
32. Tekeş E, Toraman Ç. Investigating the effects of pharmacology flashcards on academic achievement and attitudes in medical students. Tıp Eğitimi Dünyası. 2024;24(72):59–69. doi:10.25282/ted.1595920
33. Pan SC, Zung I, Imundo MN, Zhang X, Qiu Y. User-generated digital flashcards yield better learning than premade flashcards. J Appl Res Mem Cogn. 2023;12(4):574. doi:10.1037/mac0000083
34. Bahari PK, Dewi RSI, Ekawati R. Optimalisasi pendekatan culturally responsive teaching (CRT) dalam pembelajaran abad 21. DIAJAR: J Pendidik dan Pembelajaran. 2025;4(1):52–60. doi:10.54259/diajar.v4i1.3901
35. Serra MJ, Kaminske AN, Nebel C, Coppola KM. The use of retrieval practice in the health professions: a state-of-the-art review. Behav Sci (Basel). 2025;15(7):974. doi:10.3390/bs15070974
36. Xu J, Wu A, Filip C, Patel Z, Bernstein SR, Tanveer R, *et al*. Active recall strategies associated with academic achievement in young adults: a systematic review. J Affect Disord. 2024;354:191–8. doi:10.1016/j.jad.2024.03.010
37. Xodabande I, Iravi Y, Mansouri B, Matinparsa H. Teaching academic words with digital flashcards: investigating the effectiveness of mobile-assisted vocabulary learning for university students. Front Psychol. 2022;13:893821. doi:10.3389/fpsyg.2022.893821

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