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RESEARCH REPORT

Narrative pedagogies in cranial nerve anatomy: Comparing mythological and sports-based approaches with traditional teaching

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Abstract

This study used a mixed methods randomized controlled experimental design to evaluate the effectiveness of narrative-based versus traditional pedagogy in teaching cranial nerve anatomy to medicine students. Eighty-eight students who had completed a previous course on the nervous system were randomized into three groups: a control group receiving standard theoretical and practical anatomy instruction, a group using a mythological narrative ("Supper of Gods"), and a group using an animated sports-themed narrative ("Head Coach Hypoglossus"). Knowledge acquisition was assessed using pre- and post-intervention multiple choice tests, while qualitative data were collected using structured interviews in the narrative groups. Results showed no significant baseline differences between groups. Although all groups improved after training, only the Head Coach Hypoglossus group showed significantly higher post-test scores (mean 13.13 ± 1.73) compared with the control (10.39 ± 3.89) and mythological narrative (10.86 ± 2.54) groups ($p < 0.01$). Qualitative analysis revealed that most students in the narrative groups reported improved memorization, short-term recall, and motivation, with 62% citing easier recall and 68% describing increased engagement. However, some students found story creation challenging (45%) or time-consuming (38%), and a minority felt that the narrative approach could distract from the core content. In conclusion, the integration of animated, character-driven narratives (particularly the sports-themed approach) significantly improved short-term learning outcomes and student engagement compared to traditional and myth-based methods.

KEYWORDS
anatomy, education, qualitative research, quantitative research, storytelling

INTRODUCTION

Narrative pedagogies

The benefits of narrative medicine are outlined in an article that reviews the literature and then outlines ways in which narrative medicine can be integrated into clinical care and medical education at undergraduate, postgraduate, and continuing medical education levels. Narrative medicine is an accessible, diversity-conscious, low-cost and under-utilized educational framework that has the potential to revolutionize patient care, support underserved clinicians, reduce clinician burnout, and improve team dynamics.[1,2]

Narrative pedagogy becomes possible when teachers and students recognize a reflective, interpretive approach as a call to

reflection. Lecturers facilitate narrative pedagogy by creating spaces in their schools and courses for reflection.[3]

Narrative pedagogy is a phenomenological approach developed through extensive research into the experiences of faculty and students in medical education.[4,5] It employs hermeneutic analyses to understand how educators teach and how students learn to become physicians. This pedagogy reflects the contemporary context of medical education, addressing the competing demands faced by faculty and students in rapidly evolving clinical settings.[6]

Narrative pedagogy emphasizes understanding human experiences in healthcare through shared stories, fostering collaboration and reflection. It has been used to explore patient, doctor, and family perspectives, and to challenge conventional wisdom while constructing new knowledge. This approach is supported by its use in nursing education to interpret clinical stories and develop reflective practices.[7]

As a philosophy, narrative pedagogy introduces "concernful practices" and creates collaborative learning environments. It draws on theories of empathy, moral development, and transformative learning to guide faculty and students in fostering humanistic aspects of Medicine.

The use of narratives in medical education has been shown to enhance empathy, reflective thinking, and patient-provider communication by engaging learners with real-life clinical stories and encouraging ethical imagination.[8]

Theoretical infrastructure of the study

The foundation of anatomy education has traditionally centered around classical methodologies, employing a mixture of theoretical lectures and practical dissections to immerse students in structural knowledge. Studies reveal that traditional gross anatomy education remains highly effective but has limitations, particularly in engaging students and fostering deep understanding. The need for educational paradigms to evolve has been underscored by a small but compelling body of literature advocating for more integrative and engaging approaches to medical education.[9,10] One promising innovative strategy is the integration of narrative techniques that align with cognitive learning theories. Stories can encapsulate complex information in a structured and meaningful way, allowing for better retention and understanding. Kim et al.'s work demonstrates that when educational approaches incorporate storytelling, students exhibit improved engagement and information retention.[11,12] The addition of artistic elements like storytelling and animation has been shown not only to enhance engagement but also to improve cognitive mapping of anatomical knowledge among students.[13]

Metaphorical anatomy education

Metaphorical anatomy education represents a shift from traditional learning methods to more innovative, story-based pedagogies. This shift capitalizes on the inherent human affinity for storytelling, which can transform abstract concepts into memorable narratives.[14] For instance, the second group in this study, dubbed the "Supper of Gods" aims to capture cranial nerve anatomy within a mythical framework involving deities. This approach has the potential to foster a richer emotional connection with the material, making it more actionable and relevant during clinical practices. Moreover, the "Head Coach Hypoglossussus" group, utilizing an animated football narrative, expands on this by creating characters that embody the functions of the cranial nerves themselves.[15] The successful integration of character-based learning has been substantiated in various educational studies, indicating that visual and relatable representations can significantly enhance student engagement and information retention.[16,17] The anecdotal components involved in these metaphors not only stimulate interest but also allow the learners to contextualize detailed anatomical knowledge within familiar scenarios, contrasting sharply with the traditional, often sterile, lecture environment: A sterile environment, marked by minimal sensory and contextual cues, can reduce learning effectiveness. Research shows that enriched environments enhance engagement and memory, whereas overly clinical settings may diminish motivation and attention.[18,19] The absence of visual or interactive cues limits memory retrieval, and impersonal surroundings can reduce emotional involvement—both crucial for learning.[20] Furthermore, stress induced by rigid environments may impair working memory, while limited opportunities for collaboration weaken active learning.[21,22] Thus, excessive sterility may suppress the cognitive, emotional, and social processes that support effective learning.

Study design

Students were randomized using a computer-generated list to ensure equal allocation. Blinding of the instructor was not feasible and is acknowledged as a limitation.

The study design presented involves three distinct groups aimed at exploring different educational methodologies for teaching cranial nerve anatomy. The classical anatomy training group serves as a control group, providing traditional theoretical and practical anatomy lessons. In contrast, the other two groups leverage storytelling approaches to convey anatomical knowledge: one through mythological narratives involving gods and the other through an athletic-themed animated story. This innovative shift in teaching methodology evaluates this novel strategy in its pedagogic effectiveness and retention rates against traditional pedagogies within a comparative framework.

The present study aims to fill this gap by comparing traditional anatomy instruction with two narrative-based approaches: (1) a mythological narrative ("Supper of Gods") and (2) an animated sports-themed narrative ("Head Coach Hypoglossus"). It was hypothesized that narrative methods would enhance students' understanding and recall of cranial nerve anatomy, with the sports-themed approach potentially showing the greatest impact due to cultural relevance and relatability.

MATERIALS AND METDODS

Ethical approval

Ethical approval for this study was obtained from the Clinical Research Ethics Committee of Ordu University with decision number 2024/09 on 04.04.2024. Informed consent, both written and verbal, was obtained from individuals who were willing to participate in the study. Participants were provided with a voluntary informed consent form, which included information that they could withdraw from the study at any time and that their data would be kept. Students were encouraged to use their nicknames on the preliminary and final tests by explaining that it would not affect their grades in the course, and that the nicknames would only be used as a result of this study.

Sample size

The sample size of this study was calculated using the G-Power program. According to the results of the program, it was calculated as (α: 0.05, 1–β: 0.80, effect size: 0.4) and it was determined that there should be at least 22 participants in each group. Randomization was performed using a computer-generated sequence. Allocation was concealed until interventions began. Although instructor blinding was not feasible, post-test scoring was conducted independently by three blinded faculty members to reduce bias. Although the study began with a total of 96 participants, 32 in each group, due to the parametric structure of the study and the possibility of dropout, the study was completed with a total of 88 participants, 28 in the control group and 30 in the metaphor groups (Table 1).

Inclusion criteria

- To apply with a voluntary declaration of consent
- To be a student at the Faculty of Medicine at Ordu University.
- To have completed the course on the nervous system

Exclusion criteria

- Voluntary withdrawal of consent – Failure to attend at least 1 of the training activities.
- Failure to take the final assessment test.
- Different answer to a duplicate question (In both the preliminary and final exams, one question was duplicated to strengthen the evaluation).

Two participants from metaphor Group 1 were excluded from the study because they did not complete the story writing, two participants from metaphor Group 2 were excluded because they did not take the final assessment exam, and four participants from the control group were excluded because they gave different answers to the duplicate question.

Demographic characteristics

A demographic table (age, gender, prior GPA) was prepared to demonstrate comparability of groups and to exclude potential confounders (Table 1).

Participant level of education

All participants in the study had previously completed the course on the nerve system at Ordu University's Faculty of Medicine, coordinated by the study's lead author.

Measures taken

Participants were informed about what was expected of them and their responsibilities before the study through a question-and-answer session. It was explained that participants who did not fulfill their responsibilities in the study would be excluded from the study.

Preliminary test

The preliminary test used in the study was designed to determine the level of knowledge of the participants and to minimize bias. The test consisted of 20 multiple choice questions with five options. To strengthen the assessment, one question was prepared as a duplicate (Data S3). Students who gave different answers to the duplicate question were excluded from the study. The scoring was based on 19 questions, as duplicate questions were accepted as a single

TABLE 1 Demographic characteristics of participants.

Group	N	Age (mean ± SD)	Gender (F/M)	GPA (mean ± SD)
Control	28	21.4 ± 1.2	16/12	3.01 ± 0.32
Supper of Gods	30	21.6 ± 1.3	18/12	3.04 ± 0.28
Head Coach Hypoglossus	30	21.5 ± 1.1	17/13	3.06 ± 0.30
Total	88	21.5 ± 1.2	51/37	3.04 ± 0.30

question. Statistical analysis was performed between the groups and as there was no difference between the groups ($p > 0.05$), the groups were defined and training was given. Training was given to each group for 3 h a day, 1 day a week for 3 weeks.

Interventions

Control students received theoretical + practical classical anatomy. The stories given by the senior author were developed by the intervention groups. Initial stories were written by the senior author.

Group 1: This group was designed as a control group. This group was given the cranial nerve course by the main author as 2 h theory, 1 h practical.

Group 2: This group was designed as a metaphor Group 1. Students in this group developed the story of the Supper of Gods (Data S1).

Group 3: This group was designed as a metaphor for Group 2. Students in this group developed the story of Head Coach Hypoglossus (Data S2).

Final test

At the end of the study, a final test was administered. The final assessment test consisted of 20 multiple choice questions with five options. As in the pre-assessment, one question was prepared as a duplicate (Data S4). Students who answered the duplicate question differently were excluded from the study. As the duplicate questions were accepted as a single question, the study was analyzed over 19 questions.

Reliability of preliminary and final examinations

The preliminary and final exams were evaluated by three independent anatomy faculty members and deemed suitable for the study. In addition, the questions of preliminary and final exams were answered by students from the Faculty of Medicine at Ordu University, who were excluded from the study. It was found that there was no difference in level between the pre- and post-tests.

Reliability analysis

The multiple choice tests used in this study were reviewed by three independent faculty members for content validity. In addition, internal consistency was examined using the Kuder–Richardson Formula 20 (KR-20). This reliability measure was applied separately to the pretest and post-test to ensure that both instruments provided consistent assessments of students' knowledge.

Qualitative data analysis

To illustrate the qualitative themes more vividly, additional student quotations have been included. For example, one student in the sports-narrative group reflected: "When hypoglossus was described as a coach, I felt like I was part of a real team; this helped me remember which nerve controlled which function." Another explained: "I could visualize the characters moving on the field, and this image came back immediately during the test." In contrast, a mythological group student commented: "Although the gods' story was interesting, it sometimes felt distant from daily life, and I could not always link it to the nerve functions." These narratives demonstrate both the cognitive strengths and the contextual challenges of each approach.

The study was epistemologically postpositivist. Interview forms were prepared for the students in the metaphor groups. Themes and codes were created according to the answers given by the students.

Statistical analysis

The analysis of the normal distribution of this study was performed using five parameters (Shapiro–Wilk test, skewness, kurtosis, mean/STD, Q-Q plots, histogram). Since the data in the study received a score above 3 and the number of data was sufficient, parametric tests were performed by assuming that the data were normally distributed. Mixed-way ANOVA test was used to compare groups by time and training model. Effect sizes (Partial Eta Squared) were calculated to assess the magnitude of differences. Bonferroni correction was applied. The IBM SPSS 23.00 package was used for the statistical analysis of this study.

RESULTS

Quantitative analysis

Pretest assessment

At baseline, the mean scores for Groups 1–3 were 6.39 ± 2.42, 6.43 ± 1.79 and 6.50 ± 1.43, respectively. No statistically significant difference was found between the groups ($p > 0.05$) (Table 2). The lowest and highest scores were determined as groups 1: 3–13, 2: 3–11, and 3: 4–9.

Final test scoring

Effect sizes were calculated (partial eta squared) and indicated a moderate to large effect of group membership on outcomes. The groups' mean scores at the final examination were 10.39 ± 3.89, 10.86 ± 2.54 and 13.13 ± 1.73, respectively. According to the

statistical analysis, the difference between the Control, Supper of Gods and Head Coach Hypoglossus groups between the pretest and post-test was found to be highly significant (F(time): 182.564; $p < 0.001$). The effect size (Partial Eta Squared = 0.102) indicated a moderate group-by-time interaction, demonstrating that the intervention had a meaningful impact on learning outcomes (Table 3). Training without group discrimination was effective in the learning process.

The effect of the factors showing the measurements of being in different groups at different times on the learning score of the participants was found to be significant (F (time*group): 4.837; $p < 0.01$). In other words, there was a difference in the level of learning between the groups. According to the analysis performed to determine the difference between the groups, there was no difference between Group 1 and Group 2 ($p > 0.05$), while a highly significant difference was found in Group 3 when compared to both Group 1 and Group 2 ($p < 0.01$) (Table 2).

Reliability of the assessment instruments

To ensure measurement reliability, KR-20 coefficients were calculated for the assessments. The results showed that the pretest achieved a reliability coefficient of 0.81, while the post-test yielded 0.78, both reflecting acceptable levels of internal consistency.

TABLE 2 Preliminary and final test mean scores of the groups.

	Preliminary test	Final test
Group 1 (Control)	6.39 ± 2.42^{a}	10.39 ± 3.89^{b}
Group 2 (Supper of Gods)	6.43 ± 1.79^{a}	10.86 ± 2.54^{b}
Group 3 (Coach Hypoglossus)	6.50 ± 1.43^{a}	13.13 ± 1.73^{c}

Note: Mixed-way ANOVA was used to compare between groups. Equal letters indicate that there is no difference between the groups and different letters indicate that there is a difference between the groups. Bonferroni correction was used for post hoc comparisons.

Qualitative data analysis

Codes, themes and subdimensions were created according to the data obtained from the students' opinion forms (Table 4).

Cognitive gains

Most students (62%) reported that scenario-based learning improved memorization and short-term retention (code: "easier memorization/short-term retention"). Many stated that associating information with stories made recalling easier and more permanent.[23] For instance, one student said, "When I create a story in my mind, I can learn the information more easily and remember it for a long time." Another reflected, "After memorizing through stories, I didn't forget the information the next day; it became more permanent."

Additionally, 21% of students highlighted the enhancement of creativity and holistic understanding (code: "creativity/holistic understanding"). One student shared, "I found myself thinking more creatively and could see the bigger picture in anatomy."

A further 17% reported that scenario-based learning developed their analytical and critical thinking (code: "analytical/critical thinking"), as in: "I improved my analytical thinking and could connect different concepts much better."

However, despite these cognitive gains, a minority (9%) expressed concerns that the story-based method could distract from the core content (code: "distraction from content"). For example, a student noted, "Sometimes the story distracts me from the actual content." This contrast highlights that while the majority found cognitive benefits, a small group felt it could lead to superficial learning if not managed carefully.

Motivation and engagement

A large proportion (68%) described increased motivation and engagement (code: "motivation/fun/active participation") as a key

TABLE 3 Analysis of the group-time relationship.

	Sum of squares	df	Mean square	F	Sig. (p)	Partial eta squared (η^2_p)	Observed power
Source of variance							
Inter-groups							
Group	33,902	2	16.951	6.016	0.004	0.124	0.86
Error	239,495	85	2.818				
Intra groups							
Time	1108,626	1	1108.626	182.564	<0.001	0.682	0.99
Time*Group	58,742	2	29.371	4.837	0.01	0.102	0.80
Error	516,167	85	6.073				

Note: Mixed-way ANOVA was used for comparison between groups. Box' test was evaluated with Greenhouse–Geisser because $p < 0.05$. Bonferroni correction was used for post hoc comparisons.

TABLE 4 Qualitative data analysis.

Question (English)	Theme	Subdimension	Codes (Main ideas)
What did you experience during the scenario-based learning process?	Learning Experience	Cognitive Gains	Easier memorization, long-term retention, visualization, holistic understanding, creativity
Which aspects of scenario-based learning positively affected your learning process?	Positive Aspects	Motivation and Engagement	Increased motivation, fun, active participation, collaborative learning, interest
What challenged your learning process during scenario-based learning? Why?	Challenges	Barriers and Limitations	Difficulty creating stories, time-consuming, content overload, adaptation issues
How would you explain the positive sides of this course to new students?	Positive Aspects	Motivation and Engagement	Simplifies complex topics, boosts interest, supports teamwork, memorable learning
How would you explain the negative sides of this course to new students?	Challenges	Barriers and Limitations	Time-demanding, risk of distraction, not suitable for everyone, extra workload
If you compare yourself before and after the scenario-based learning experience, what differences do you see?	Learning Experience	Cognitive Gains	Improved creativity, critical/analytical thinking, better communication, teamwork
If you had to convince someone not to implement scenario-based anatomy education, how would you justify it?	Critical Perspective	Barriers and Limitations	Not efficient for strong memorizers, time-consuming, unnecessary for some, not universally effective
What would you recommend to students before they start this course?	Recommendations	Study Strategies	Be systematic, use repetition, visualize, do not hesitate to create stories, stay open-minded

benefit. Many found the lessons more enjoyable and stimulating, which encouraged active participation. For example: "It was fun; I wanted to study more and participate in group activities." Another stated, "Creating stories with my friends made the lessons much more interesting and memorable."

About 23% specifically valued the collaborative aspect (code: "collaborative learning"), saying, "Working together on stories improved our communication and made learning less stressful."

Nevertheless, 11% of students reported that they did not find the process engaging or suitable for their learning style (code: "not engaging/boring"). One student explained, "If you don't like storytelling, it can be boring and feel unnecessary."

This reveals a tension: while most students found scenario-based learning motivating, a notable minority did not experience increased engagement and sometimes preferred traditional methods.

Barriers and limitations

About 45% of students identified difficulty in creating meaningful stories as a significant challenge (code: "difficulty creating stories"). One student commented, "It was hard to come up with a scenario, but once I did, it was effective."

Thirty-eight percent cited time consumption as a major barrier (code: "time-consuming"), as in: "Writing the story takes a long time, but the information stays in your mind longer."

Sixteen percent mentioned that scenario-based learning might not suit everyone, especially those who prefer memorization or have limited time (code: "not suitable for everyone"). For example: "If your memorization is strong, you might find it unnecessary to spend so much time writing stories."

Nine percent felt that the method could sometimes lead to distraction or overwhelm due to workload (code: "distraction/overwhelm"), as in: "You may get carried away with the story rather than focusing on the lesson."

Interestingly, some students acknowledged both sides: while the majority found the method effective for learning, a significant minority pointed out that it requires adaptation and that its benefits may depend on individual learning preferences.

Study strategies

Most students (74%) recommended systematic study strategies and an open-minded approach (code: "systematic study/repetition/visualization"). They advised frequent repetition, visualization, and not hesitating to create stories, even for small details. For example: "Be systematic, repeat often, and try to visualize the paths of the nerves in your mind." Another said, "Don't hesitate to create stories and focus even on the smallest details in your notes."

Thirteen percent emphasized the importance of not being prejudiced against new methods and being willing to try different approaches (code: "open-mindedness"). As one student put it, "Be open to new methods; learning can be easier and more enjoyable than you think."

However, a small group (8%) cautioned that despite these strategies, the method might not work for everyone and could be time-consuming (code: "not for everyone/time concern"):

"If you are systematic but have little time, this method can be overwhelming."

Scenario-based anatomy learning was perceived by most students as effective for improving memorization, retention, motivation, and collaboration. The most common codes were "easier memorization/long-term retention" (62%), "motivation/fun/active participation" (68%), and "systematic study/repetition/visualization" (74%). However, significant barriers were also noted, especially "difficulty creating stories" (45%) and "time-consuming" (38%). While the majority praised the method's creativity and engagement, a notable minority found it distracting, unsuitable for their style, or burdensome in terms of time. Direct student quotes illustrate both the strengths and the limitations, emphasizing the need for flexible and supportive course design. These qualitative insights were cross-validated with quantitative performance data: students in the sports-narrative group, who most frequently reported easier memorization and higher motivation, also achieved the highest post-test scores (13.13 ± 1.73), while those in the mythological narrative group, who less frequently emphasized such benefits, showed no significant improvement over the control group (10.86 ± 2.54 vs. 10.39 ± 3.89). This alignment indicates that the perceived benefits and limitations of scenario-based strategies varied by student performance quantile, with higher performing students deriving greater cognitive and motivational gains and lower performing students more often emphasizing barriers such as time consumption and difficulty in story creation.

Integration of Quantitative and Qualitative Findings: In integrating quantitative and qualitative results, it is notable that the "Head Coach Hypoglossus" group not only achieved the highest post-test scores but also produced the richest qualitative feedback. Students in this group more frequently described enhanced motivation (68%) and easier recall (62%), which aligns directly with their superior quantitative outcomes. Conversely, the mythological group did not show significant score improvements over the control, and qualitative reports mirrored this with fewer references to memorization or engagement. This alignment of numeric performance with subjective experiences strengthens the claim that culturally familiar and personally relatable narratives may yield both measurable academic benefits and deeper learning satisfaction.

This study suggests that scenario-based narrative learning offers significant advantages in anatomy education, particularly when narratives are designed to be relatable and culturally relevant to students. The analysis of both quantitative and qualitative data reveals that scenario-based approaches foster cognitive gains, enhance motivation and engagement, and encourage the development of effective study strategies, though they also introduce certain challenges.

DISCUSSION

For narrative readers to achieve a clearer understanding, the cranial nerves were summarized in a table (Table 5).

Cognitive gains

One of the most prominent findings of this research is the improvement in cognitive outcomes, especially in terms of memorization, long-term retention, and the ability to synthesize complex anatomical information. Students exposed to narrative scenarios consistently reported that embedding anatomical facts within a story framework made the material more memorable and easier to recall.[24] These results are strongly supported by previous literature,

TABLE 5 Summary table of the 12 cranial nerves and their main functions.

Cranial nerve	Latin name	Simple explanation
I	N. olfactorius	Smell nerve – Carries the sense of smell from the nose to the brain.
II	N. opticus	Vision nerve – Transmits visual information from the eye to the brain.
III	N. oculomotorius	Eye movement nerve – Moves 4 eye muscles (except 2). Also controls pupil constriction and lens focusing (parasympathetic)
IV	N. trochlearis	Superior oblique muscle nerve – Moves the eye downward and outward
V	N. trigeminus	Chewing and facial sensation nerve – Provides feeling (touch, pain, temperature) on the face and moves chewing muscles
VI	N. abducens	Side-looking nerve – Moves the eye outward (lateral rectus muscle)
VII	N. facialis	Facial expression nerve – Controls facial expressions (smile, frown). Also carries taste (front 2/3 of the tongue) and controls some glands (parasympathetic)
VIII	N. vestibulocochlearis	Balance and hearing nerve – Responsible for balance and hearing
IX	N. glossopharyngeus	Tongue and throat nerve – Taste and sensation in the back 1/3 of the tongue, helps with swallowing, and some parasympathetic functions
X	N. vagus	Chest and abdominal organ nerve – Controls voice (larynx), swallowing, and sends parasympathetic signals to the heart, lungs, and digestive system
XI	N. accessorius	Neck muscle nerve – Moves the sternocleidomastoid and trapezius muscles (head and shoulder movement)
XII	N. hypoglossus	Tongue muscle nerve – Controls movements of the tongue

which highlights the positive impact of contextual and narrative learning on knowledge retention and understanding in medical education.[24,25] Moreover, the development of creative and analytical thinking skills, as observed in this study, aligns with the broader educational goal of fostering higher-order cognitive abilities in health sciences curricula.[25]

Motivation and engagement

The motivational and engagement benefits of scenario-based learning were also clearly demonstrated. Students found narrative-based approaches more enjoyable and stimulating than traditional methods, which in turn increased their willingness to participate and collaborate.[26] This is consistent with the literature emphasizing that active, student-centered learning environments promote deeper engagement and satisfaction. The group using a culturally familiar narrative (Head Coach Hypoglossus) not only achieved higher test scores but also reported greater satisfaction, suggesting that the relevance and relatability of the narrative context are critical for maximizing both engagement and learning outcomes.[27]

Barriers and limitations

Despite these advantages, the study also identified notable barriers and limitations. The most significant challenges reported were the difficulty of creating meaningful and coherent stories and the time-intensive nature of the scenario-based approach. These findings mirror those of previous literature, who caution that while narrative and scenario-based methods can be highly effective, they may require substantial effort and time, potentially limiting their scalability in content-heavy curricula.[28] Additionally, not all students found narrative approaches equally beneficial; some preferred traditional memorization techniques or struggled with the creative demands of story construction.[29] This underscores the importance of providing adequate guidance, scaffolding, and flexibility in instructional design to accommodate diverse learning preferences.

While some studies suggest that any narrative can enhance learning, our findings indicate that the type and context of the narrative are crucial. Narratives that are culturally and personally relevant to students are more likely to be accepted and internalized, leading to better educational outcomes.[30] This nuance adds depth to the existing literature and highlights the need for careful narrative selection in anatomy education.

Study strategies

The study also revealed that students who adopted systematic study strategies – such as frequent repetition, visualization, and active engagement with narrative construction – were better able to benefit from scenario-based learning. These findings are in line with recommendations from the literature, which advocate for structured practice and the use of visual and narrative aids to support learning in complex subjects like anatomy.[31–33]

Integration with quantitative findings

Quantitative results further validated the effectiveness of scenario-based learning. All groups showed improvement in post-test scores, but the Head Coach Hypoglossus group (using a football team narrative) outperformed both the control and the mythological scenario group. This suggests that scenario-based learning is not only effective in general but is most impactful when the narrative context resonates with students' cultural backgrounds and interests.[34]

CONCLUSION

This study should be interpreted with caution, considering limitations, such as lack of blinding, single-institution design, absence of demographic subgroup analysis, and qualitative data collection restricted to narrative groups. Scalability remains a challenge due to time demands. In conclusion, narrative and metaphoric methods are promising, cost-effective, and inclusive strategies for medical education, particularly in anatomy, yet, their scalability across content-heavy curricula remains a potential challenge that should be acknowledged. Educators can address the limitations of traditional approaches, support diverse learning preferences, and better prepare students for the complexities of clinical practice by harnessing the power of storytelling and creative engagement. Future research should explore scalable models for integrating these pedagogies into wider curricula and investigate their long-term impact on professional competencies and patient care.

Limitations

This study is not without limitations. Qualitative data were not collected from the control group, limiting the ability to compare subjective experiences across all instructional methods. The research was conducted at a single institution, which may affect the generalizability of the findings. Additionally, the time-intensive nature of scenario-based learning may pose practical challenges for widespread implementation in curricula with heavy content loads. Finally, while the sample size was sufficient for initial insights, larger and more diverse populations would strengthen the validity of the results.

Future work

Future research should explore scalable models for integrating narrative and metaphoric pedagogies into broader medical curricula

and examine their long-term effects on professional competencies and patient care. Multi-institutional studies with larger and more diverse student populations are also needed to enhance generalizability. Additionally, further work could investigate adaptive instructional designs that balance creativity with time efficiency, thereby addressing scalability challenges while preserving the pedagogical benefits observed in this study.

AUTHOR CONTRIBUTIONS

Halil Yilmaz: Conceptualization; data curation; formal analysis; investigation; project administration; methodology; writing – original draft; writing – review and editing; supervision. **Dilber Polat:** Formal analysis; methodology; validation; writing – original draft; writing – review and editing.

CONFLICT OF INTEREST STATEMENT

No conflict of interest was declared by the author.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

Ethical approval for this study was obtained from the Ordu University Clinical Research Ethics Committee with decision number 2024/09 on 04.04.2024. Written and verbal informed consent was obtained from individuals who wished to participate in the study. Participants were given a voluntary informed consent form, which included information that they could withdraw from the study at any time and that their data would be kept.

DECLARATIONS

Compliance with ethical standards.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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