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EDUCATIONAL TECHNIQUE

Complementary Teaching Strategies Anchored in the Peer-Assisted Learning Model

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Context: Peer learning often happens naturally in athletic training education. Deliberate use of evidence-based learning models and strategies related to peer learning could make the peer work more effective.

Objective: To describe the approach to learning in the athletic training classroom, using the peer-assisted learning model, reciprocal teaching style, and structured peer feedback, that may improve student progress toward learning outcomes.

Background: The 3 complementary strategies have been described independently in the athletic training literature as well as in other health care curricula. The positive findings related to student learning continues to support the use of these pedagogic practices; however, they have not been explored as a collective way to design a course that includes a multitude of cognitive and psychomotor competencies. The reciprocal teaching style and structured peer feedback complement the peer-assisted learning model, offering a familiar didactic environment to address learning outcomes.

Description: Two therapeutic modalities courses were taught using the peer-assisted learning model with the use of reciprocal teaching style to encourage the expected student roles and behaviors. Structured peer feedback offered opportunities for increased student socialization and focus on improving clinical skills through low-stakes interactions.

Advantage(s): The integration of reciprocal teaching style and structured peer feedback within the peer-assisted learning model may allow students to deliberately interact with each other and progress through course content and application.

Conclusion(s): Through purposeful course design, athletic training educators may foster a classroom environment (lecture and lab) that focuses students on practicing skills and reinforcing correct technique through productive and constant communication.

Key Words: Instructional model, reciprocal teaching, structured feedback

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KEY POINTS

- The use of reciprocal teaching style and structured peer feedback supports the effectiveness of the peer-assisted learning model in a classroom setting.
- Peer-assisted learning, reciprocal teaching, and structured peer feedback encourage quality peer interaction and learning in the classroom.
- The combination of peer-assisted learning, reciprocal teaching, and structured peer feedback may offer a systematic and collaborative approach to learning for athletic training students.

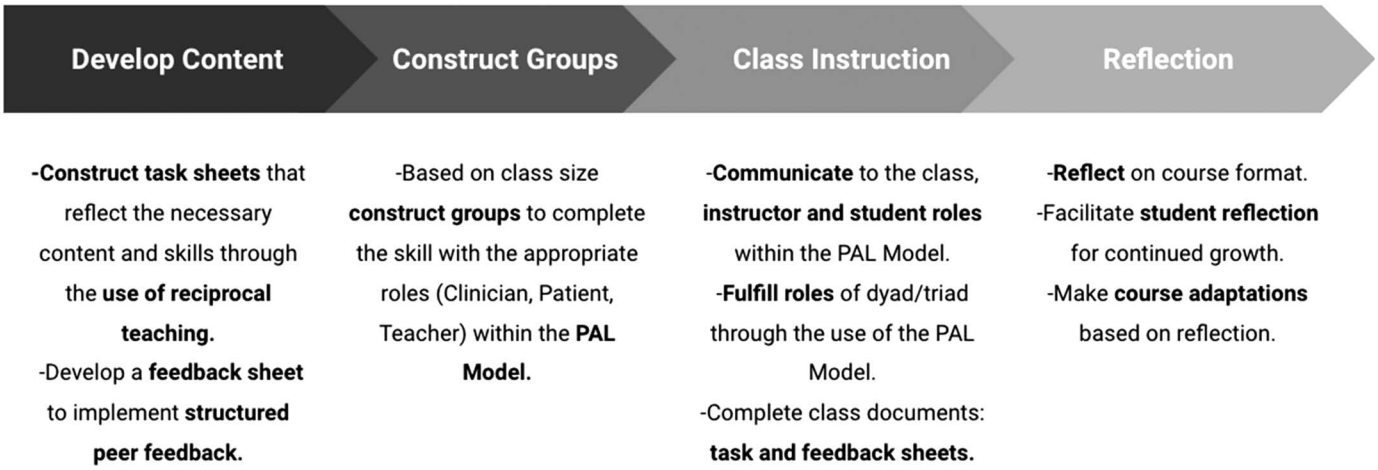
INTRODUCTION

When one considers the infinite clinical skills taught within the competency-based athletic training curriculum, one may also wonder how there is enough time for both effective teaching and learning to regularly occur. A variety of instructional techniques exist to help educators determine appropriate methods for course construction—the "how" of disseminating content and making connections with and for the learner.[1] As kinesthetic and action-oriented learners,[2] athletic training students may value instructional behaviors that augment psychomotor skill integration within their didactic courses in both a lecture and laboratory classroom environment. Clinic-based educators may find it challenging to know, from a pedagogy standpoint, what instructional methods exist, and which have been found to be effective.[3] Therefore, a solution may be for athletic training educators to incorporate pedagogic strategies that independently lend themselves to active and enhanced learning in the classroom. The peer-assisted learning (PAL) model, reciprocal teaching style, and structured peer feedback are complementary pedagogic strategies easily adaptable and relevant within the athletic training curricula. Separately, each of these strategies has been revealed as supporting positive instructional behaviors and engaged student learning, as acknowledged in the literature.[4–33]

Instructional models are theoretical frameworks for building a course to effectively immerse students in the content to be learned. Instructional models are a collection of strategies that integrate several components important to learning: learning theory and domains, teacher content knowledge, developmentally appropriate activities, teacher and student expected behaviors, task structures, learning outcome measures, and reflection on use of the model.[34,35] Specifically, the PAL model allows for people who are not the instructor of record for a given course but may have appropriate content knowledge to help each other apply knowledge and hone skills as they learn through various roles and experiences themselves.[36] In the athletic training context, once the course instructor has taught theory and content-related concepts and demonstrated related skills, instead of simply expecting students to then practice during the remaining class time, the PAL model is undeniably an appropriate model to incorporate, as it provides structure during practice time. Under the PAL model, students are paired, and one is considered the "learner" and the other the "teacher" in the dyad makeup. Additionally, the PAL model has been found to encourage a variety of positive learning outcomes, such as enhanced learning of content, improved communication and socialization, decreased stress or improved confidence,[4–13] improved performance of skills,[37] and success on the Board of Certification examination.[38] The PAL model has also been valued as contributing to decreasing the demands of the preceptor[7] or course instructor,[39] but in no regard should the model replace their responsibilities.

Teaching styles are categorized based on the learning environment and decisions the instructor or learner makes before, during, and after instruction.[40] Mosston and Ashworth[41] developed the Spectrum of Teaching Styles to pedagogically support a unified continuum of teaching style choices defined based on decision-making. Any deliberate act in teaching can be found within this spectrum and is based on reproduction or production of knowledge.[41] When becoming acquainted with new content with specific performance criteria, instructors may want students to replicate skills and knowledge. Early skill replication and application aligns with styles clustered on the reproduction side of the Spectrum of Teaching Styles.[41] If the PAL model of instruction is implemented, structured interactions occur; therefore, the reciprocal teaching style[41] (1 of 11 styles on the Spectrum of Teaching Styles), which has a main characteristic of social interaction through students set up in pairs, is a clear choice because of similarity in application to the model.[42] Objectives achieved when using the reciprocal teaching style allow for the learner to internalize content knowledge through repeated practice chances in front of an observer, visualize the sequence of steps and details to complete a task, compare/contrast/assess the task performance, identify and correct errors in task performance, and work with the subject matter without the teacher.[41] Learning objectives centered in student behavior are also achieved during this style through the need to have peer interaction, and as a result socialization skills are expanded, communication skills are practiced, feedback is given and received, and other characteristics develop, such as patience, tolerance, acceptance, empathy, and social manners.[41,43] In addition to the achievement of learning objectives, researchers have examined students' acquisition of motor skills, and the reciprocal teaching style was found to have positive effects[14–25] in which the students were able to successfully demonstrate clinical skills.[26] Within athletic training, the term *reciprocal learning* has been researched[44,45] and is comparable to the teaching style; it has occurred in clinical education and benefited both preceptors and students. Benefits have included validation of learning and confidence,[44] a teamed approach and bringing realism to the learning experience,[45] and effective communication,[44,45] all of which support the addition of the reciprocal teaching style as another favorable instructional strategy to add to the athletic training educators' repertoire.

Figure 1. Quick guide for implementation of peer-assisted learning (PAL) model, reciprocal teaching, and structured peer feedback.



Feedback comes in various forms of communication (written, verbal, nonverbal, etc) but nonetheless must be given to encourage students to work toward proficiency of athletic training competencies, as it is a pedagogic tool that closes the learning loop.[46] Because the main characteristics of the reciprocal teaching style include social connectedness among peers,[40,41] as well as giving and receiving feedback,[22,41] the emphasis on structured peer feedback as a pedagogic strategy was deserving of attention from the course instructor in order for students to properly make use of its occurrence. Peer feedback is an inherent component of the reciprocal teaching style. Because of the equal programmatic level of the students in this described course,[47] clear attention needed to be given to the structure of the peer feedback given. At the core of delivering feedback, there is a need for trust and personal interaction,[48] which is why the combination of instructional strategies used is anchored in the PAL model. Even in smaller cohorts of students, instructors still divide their time,[48] emphasizing the need for peers to help one another. Guidance on giving feedback is possible and encouraged,[48–50] lending to its effectiveness. The benefits of peer feedback have accumulated in the literature to include an increase in time and effort on assignments from students with peer accountability on individual progress, resulting in the potential for improved performance being stimulated even by the thought of needing to perform in front of peers.[27–30] Students have indicated an easier understanding of peer feedback and mutual benefit through the process of peer feedback because the students are at a more similar learning level as contrasted with the instructor.[31–33] In combining the PAL model and reciprocal teaching style, students receive immediate, individualized input on their performance as well as an increased frequency of feedback.[21,22,30,51,52] This is a solution to the common issue wherein instructors find challenge in dividing their time among students to answer questions and refine the performance of skills while still pressing upon the fact that they, as the instructor, are the expert and available to help with the dyad of learners and clarify performance of skills.

As evidenced in the aforementioned context, each of the pedagogic strategies—PAL model,[4–13] reciprocal teaching style,[14–26] and structured peer feedback[27–33]—is independently supported in the literature. We have presented how common strategies may seamlessly combine to be collectively incorporated for a well-structured course where students accomplish learning objectives. These strategies occurred only with purposeful course design, explanation, and feedback on implementation by the course instructor. The remaining portion of this article explains how we carried out the development of a therapeutic modalities course anchored in the PAL model supported by reciprocal teaching style and structured peer feedback, which athletic training educators may wish to adapt in their own teaching of athletic training skills.

COURSE DEVELOPMENT/OVERVIEW

The PAL model and associated pedagogic techniques (reciprocal teaching style and structured peer feedback) implemented in this course were selected because of their applicability for enhanced learning of both cognitive and psychomotor skills. The course covered content related to therapeutic interventions and was taught at a Commission on Accreditation of Athletic Training Education–accredited, professional-level, undergraduate athletic training program at a public university. The combination of approaches outlined in this manuscript is widely applicable in athletic training curricula, as the authors have previously taught content in the areas of emergency response, taping and wrapping, and orthopaedic evaluation courses. Although the examples outlined in this manuscript are based primarily in therapeutic modalities, the techniques are widely applicable across content in athletic training curricula. A quick guide for implementation may be viewed in Figure 1.

PAL Model

The PAL model has been documented in the literature as an effective strategy in the facilitation of clinical education for athletic training students[4–8] and for intentional interactions outside of class to evaluate the performance of psychomotor skills by way of facilitating quality peer interactions during learning opportunities in class.[37] The application of PAL as a learning model, although well-founded in the literature across disciplines,[2,5,39,42,53–55] has not been modeled in the didactic athletic training education setting as the framework and instructional model used for the duration of a course. Use of PAL as a pedagogic strategy is common in classroom

activities; however, we propose the use of the PAL model as the anchor for successful implementation of other pedagogic techniques in the course described. The authors chose the PAL model as the backbone of the therapeutic modalities course in which it was implemented in order to give structure for the supporting strategies. The dyads inherent in the PAL model encourage a dynamic of peer colearning with which athletic students may be familiar. The PAL model is also flexible enough to incorporate supplementary pedagogic strategies that only enhance learning outcomes.

The PAL model, for the purpose of this course, was expressed through the teacher-learner dyads. For best application of the PAL model to the outlined course, the instructor implemented teacher-learner (clinician)-"patient" triads during skill practice sessions in class. The slight difference between the dyads outlined in the literature and the triads used in this class was selected for the purpose of clear and distinct roles for teacher, learner, and patient. One of the objectives of this course included the patient's reflecting on experiencing the intervention because of its significance to future patient interactions. The relationships between and responsibilities of these roles were modeled by the instructor of record at the course introduction and encouraged throughout the course through instructor feedback to the teacher in the dyad/triad, as dictated by the PAL model. The model was supported by use of reciprocal teaching style and consistent, structured peer feedback.

Proper preparation of students on how to engage during planned peer-teaching models has been found to increase the overall success of model implementation.[56] Specifically in athletic training clinical education, Bates[4] provided preparation in the form of a 50-minute session to the teachers and learners in the PAL model dyad. Following the intervention of an intentional PAL model, during clinical education experiences, to teach/learn a specific skill, the researcher found themes related to leadership and teaching for the teacher participants as well as collaboration, building relationships, confidence, exposure to various techniques, and changed clinical education experiences from all dyad participants.[4] Considering these previous research findings relative to some student instruction on involvement in a purposeful PAL model, the course instructor provided an introductory instruction to students before their involvement in a purposeful PAL model. This introduction (see Supplemental Video, available online at http://dx.doi.org/10.4085/1947-380X-20-87.S1) included a class activity to establish classroom rules and environment and a demonstration of the learning model using a skill unrelated to athletic training but expected to be common knowledge for the students in the course. Shoe tying was used as this example so students could focus on the process of serving as the learner or teacher in the dyad and the roles and responsibilities that each required. During this demonstration, students were also asked to give examples of high-quality feedback that the teacher could give to the learner during the demonstration. During the demonstration, the students were also acquainted with the task and feedback sheets they would complete in class under the PAL model when practicing all psychomotor skills. The task sheets served primarily to augment the application of the reciprocal teaching style, and the feedback sheets were implemented to assist in recording the verbal feedback given and to aid in student reflective practice.

Reciprocal Teaching Style

The reciprocal teaching style is a teaching technique that naturally couples with the PAL model. The reciprocal teaching style gives overt attention to the various roles taken on by students in a learning environment, thus giving structure to the use of peer learning techniques.

Regardless of content, students often learn at different paces.[57] The use of reciprocal teaching style within the PAL model was selected to accommodate different paces of learning and encourage engagement by all students in the learning activity. In the described course, students were grouped for psychomotor skill practice, each group with a learner (clinician), teacher, and patient, and each teacher had task sheets appropriate for the skills of the lesson. The task sheets served to assist with the course instructor's potential concern for student readiness, or ability to teach another peer, by removing the onus of expertise from the novice or varied level of learner with the different content in class. Incorporation of the reciprocal teaching style[1,41] may provide some reassurance to both the course instructor and the student engaged with the PAL model that skills are practiced accurately.

The interpersonal skills inherently practiced in the reciprocal teaching style are vital to the continued growth of students, and to support this focus, the instructor of this course designed task sheets (Figure 2), also identified as *criteria sheets* by Barney and Christenson[40] or *task cards* by other researchers,[58,59] to support the teachers in the dyads during practice opportunities. These task sheets resemble closely the competency/proficiency checklists with which many athletic training educators and preceptors may be familiar. For the proper use of task sheets, the instructor must provide instruction on the content and demonstrate how to perform a clinical skill before student practice. The task sheet was developed to reinforce the performance steps for the students to use when performing the skill and giving accurate feedback.[48,49] The reciprocal teaching style requires the teacher to take responsibility for sharing feedback on learning with their peers.[60] The inclusion of the task sheets allows the teacher to feel more comfortable with the tasks and skills at hand during a given practice session. The access/comfort with the information allows that teacher to then focus on the communication of feedback to the learner (clinician).

By taking on each of the roles, students are able to interact with the content from multiple perspectives: direct application of content and skills as the learner, observation and constructive critique as the teacher, and observation and reflection as the patient. Through the different roles, students engage in supporting the learning of their peers while also learning from their peers, improving active engagement throughout the duration of the activities during class time. The peer-supported learning environment aligns with the improvements in collaboration by students engaged in PAL[4] and active engagement in interactive teaching.[39] The added benefit of structure supporting and allowing space for multiple practice opportunities is another benefit of this teaching strategy.[61] While the behaviors of each of the roles were highlighted and reinforced by the course instructors, the task sheets served to support the quality of feedback given to and by the students in the course.

Figure 2. Task sheet for thermal diathermy.

Lab 3: Deep Heating — Clinician:

Therapeutic Modalities Peer-Assisted Feedback Form

Directions: For the skill component of the course, you will use this Peer-Assisted Feedback form to track your progress toward proficiency. For each skill, you will work with peers in class to perform the skill *a minimum of two (2) times with different peers* prior to performing with the instructor. For each skill, the peer, who has assumed the *Teacher* role, will give you feedback about your performance of the skill, in the following areas: Positive and Corrective. Recall feedback given should be specific at all times so the *Clinician/Learner* may implement feedback given in the future. The *Clinician* should reflect upon the executed skills and *Teacher* feedback and provide a statement below prior to submitting the assessment.

AT Skill	Teacher Role	Positive	Corrective	Instructor Feedback
Thermal Diathermy	Peer 1:			
	Peer 2:			

Reflection:

Structured Peer Feedback

The instructor of this course sought to use structured peer feedback to further support the learning outcomes of the course and improve engaged academic learning time. Peer feedback was modeled and structured around the feedback sheets (Figure 3). The modeled feedback at the onset of the course was centered around positive and constructive feedback, so students could work toward quality feedback for their peers over the semester. Students did not formally assess their peers, therefore; feedback was also assessed and addressed by the instructor of record for the course to improve this process throughout the semester. Cho et al[62,63] found that students appreciated and responded better to feedback from multiple peers compared with feedback from one peer or the instructor. The use of structured peer feedback for multiple practice opportunities in groups offers instructors who use the approaches outlined here the ability to maximize the benefit of each of these techniques for student learning.

Figure 3. Feedback sheet for thermal diathermy.

Lab 3: Deep Heating — Clinician:

Therapeutic Modalities

Directions: A group of three should be formed. One person in each group will assume one of the following roles: *Patient, Clinician/Learner, Teacher*. You should rotate roles so each person takes on each of the roles for the skill.
The *Clinician/Learner* should instruct the *Patient* from start to finish for each skill; just as in a practical/clinical setting. The *Teacher* should use the checklist to provide assistance to the clinician when needed. The *Teacher* is also responsible for providing feedback on the feedback sheet provided. The *Patient* should follow the instructions of the clinician but take note of personal experiences for each treatment experienced.

Skill: Setup and application of Thermal Diathermy (Denegar, Saliba, & Saliba, 2016)

Step	Trial 1	Trial 2
Patient is free of contraindications		
Position patient comfortably on nonmetal chair or table		
Remove jewelry and body piercings		
Remove clothing on treatment area		
Inspect skin for sensations and general conditions		
Dry skin		
Place absorbent towel between drum and treatment area		
Explain sensations • Warm, sedative, comfortable • If burning or p! – tell clinician		
Turn on diathermy unit		
Determine reason for use ☐ how much tissue heating needs to occur		
Select output mode:		
Immediately following treatment, perform joint mobilizations or stretching		

Skill: Questions
Start Time: _____ End Time: _____ Time when patient feels "normal": _____
Purpose for use:

The method by which the structured peer feedback was applied in the course was as follows: when students practiced skills, they worked in triads. The teacher in the group would give the learner feedback verbally and summarize it in the feedback sheet for the learner to use and reflect on after the practice session. When the feedback sheets were submitted to the course instructor for review, the instructor was able to give feedback to both learners, on methods by which they could continue to grow and practice, and teachers, to work on improving the feedback they gave to their peers. Because of the feedback process in class, instructors were able to spend more time facilitating quality interactions between the students in the course, improving the overall quality of engagement by the students with the content.

The PAL model, reciprocal teaching style, and structured peer feedback are all pedagogic strategies with which many instructors may be familiar. The purpose of this specific course design was to root the flow and activities in the course to the purposeful integration of these strategies for better student engagement and clear progress toward student learning outcomes. Peer-assisted learning as a model of learning was the undercurrent that was augmented by reciprocal teaching style and structured peer feedback to support students toward successful completion of the course.

FUTURE CONSIDERATIONS

The proposed structure outlined in this course was brought on by witnessing students struggle with managing practice sessions during in-class time. In the area of metacomprehension, merit has been discovered in affording students to self-pace their study process when learning new written content.[57] Although the course structure we describe is not focused on written/textual content, there is certainly value in allowing students the space to self-pace in class activities and studies where possible.[64] Prior to the implementation of the PAL model, reciprocal teaching style, and structured peer feedback, some students may not have thoroughly practiced skills or received enough feedback to refine those skills. In order for students to get to a place of higher-order thinking and transfer of knowledge to authentic patient encounters, they needed to confidently apply theoretical concepts and skills during

Table 1. Student Comments Regarding Course Structure

Quality repeated practice time
Peer support valued during physical practice
Course structure supported quality student interaction backed by written feedback
Appreciation for attention to hands-on learning

didactic practice. Because the PAL model, reciprocal teaching style, and structured peer feedback are individually well grounded in the literature[4–33] as positively supporting student learning in the clinical setting and logically support each other, we decided to purposely structure an entire didactic course centered on the combination of these 3 instructional methods. The methods were intertwined and part of every class throughout the duration of the course. Through the purposeful implementation of these 3 instructional methods, the course instructor was able to set the tone with regard to how students were to practice skills taught, maximizing their academic learning time throughout the entire course. The course instructor encouraged students to fully engage in this course format, so the end results included gaining more feedback, full use of their academic learning time, and readiness for the assessment of their skills.

This course has been taught several times in this manner, and student feedback has been integrated along with instructor reflection in an ongoing process of quality improvement. End-of-semester instructor evaluations asked students to reflect on this course structure as compared with that of other athletic training courses. Overall, students responded favorably to the course structure (Table 1) based on end of semester instruction evaluations. In regard to the task sheets, the instructor implemented small changes in the course design to more carefully align the content of the task sheets with required course materials. Students in early iterations of the course found some confusion with the minor discrepancies that existed between task sheets and resources (Table 2), which are continually checked and clarified in an ongoing process by the instructor.

Early forms of the described course lacked connection between the peer feedback/task sheet documents and formal assessment in the course (ie, exams and other assignments). The instructor adjusted in subsequent semesters to purposefully include reflection for the students in the course. There are 2 main approaches the authors have used with success to promote student reflection on peer feedback. One approach to including student reflection is requiring the learner in the dyad to summarize in their own words the feedback received from the teacher. This summary may include reflection and plans for future study and practice. The other approach used by the instructor in this course includes the use of reflection questions in lab write-up assignments and formal exams. These reflection questions may facilitate learning over time for students by prompting them to revisit class content and materials they may not otherwise prioritize themselves. Delayed reflection and description of practice may be more effective, as Anderson and Thiede[65] described the greater value of delayed over immediate summary in regard to memorization of written texts.

Table 2. Student Comments Regarding Task Sheets

Confusion regarding inconsistencies between task sheets and text/resources
Improved and directed focus in class
Augmented self-directed studying/study guides
Peer feedback in real time rather than waiting for the instructor
Encouraged honest and authentic peer communication and feedback

CONCLUSIONS

Students and educators in health care fields such as athletic training rely strongly on the collaboration of peers to work together toward learning outcomes. The work of peers practicing applied and psychomotor skills, especially in the athletic training clinical setting, is commonplace and well supported by the literature.[8,9,38,55] Each of the pedagogic strategies (PAL model,[7–16] reciprocal teaching style,[24–36] and structured peer feedback[44–50]) has been identified in the literature independently, but they have not yet been described as implemented together. Independent of each other, each of these pedagogic strategies support student learning, but together, these 3 strategies may offer a whole greater than the sum of their parts. These benefits may include cognitive and psychomotor progress in skill and application, as well as merit in affective domains. Students may find value in the collaboration and communication practiced in courses founded in these pedagogies, which, although difficult to measure, is arguably also a benefit.

The authors suggest that a course anchored in the PAL model, reciprocal teaching style, and structured peer feedback be examined moving forward for both effectiveness and student perception. Student perception of the strategies and reflection on progress toward learning outcomes for a course should be explored further to determine the possible value of such a combination of pedagogies. Educators should also further consider the varied application possibilities of the combination of the PAL model, reciprocal teaching style, and structured peer feedback in other content areas in athletic training curricula.

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