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Applying Chain-of-Thought techniques in rehabilitation therapy education

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Abstract
Rehabilitation therapy is a discipline that closely integrates theory and practice, requiring students to master solid professional knowledge and possess the ability to apply it flexibly. However, traditional teaching modes need more cohesive knowledge and a disconnect between theory and practice, affecting student learning outcomes. As an innovative teaching method, mapping techniques can effectively address this issue. This paper elucidates the theoretical foundation of the Chain-of-thought Technique while focusing on its application strategies in rehabilitation therapy education. Combining knowledge deconstruction and systematic teaching helps students build a comprehensive knowledge system. Secondly, reinforcement training and thought provocation are emphasized, promoting knowledge internalization and flexible application.Furthermore, deepening understanding and interactive teaching are consistently incorporated, realizing the integration of theory and practice. Finally, a case analysis is provided to illustrate the specific applications of the Chain-of-thought Technique in teaching. The Chain-of-thought Technique upholds the principles of "deconstruction, systemization, reinforcement, provocation, deepening, and interaction," establishing connections between theory and practice and between teachers and students. It is conducive to improving the quality and effectiveness of rehabilitation therapy education, fostering comprehensive student development, and is an innovative method worth promoting in professional education.

Keywords: Chain-of-thought technique, teaching reform, rehabilitation therapy education, teaching strategies

Introduction

Rehabilitation therapy is an interdisciplinary field that integrates knowledge from medicine, exercise science, psychology, and other domains, posing comprehensive and professional demands on practitioners. The education of rehabilitation therapy requires imparting systematic theoretical knowledge and cultivating students' ability to apply their learned knowledge to practice flexibly. However, traditional classroom teaching modes emphasize the one-way transmission of theoretical knowledge, needing more effective nurturing of students' cognitive abilities. This leads to students acquiring fragmented knowledge and engaging in passive learning.

As an innovative teaching method, the Chain-of-thought Technique advocates promoting active knowledge construction by students through stages of deconstruction, systemization, reinforcement, provocation, deepening, and interaction, forming a compre-hensive knowledge system and cultivating the ability to apply knowledge flexibly. This technique aligns closely with the objectives of rehabilitation therapy education and holds significant theoretical and practical value. This paper aims to systematically discuss the application strategies of the Chain-of-thought Technique in rehabilitation therapy education and provide a case analysis to offer beneficial insights for improving the quality of professional education.

Research background

The Chain-of-thought Technique originated from the "Mind Map" concept proposed in the 1980s, advocating the organic linking of dispersed knowledge points to form a network structure, facilitating learners in constructing a comprehensive knowledge system. In recent years, the Chain-of-thought Technique has gained widespread attention and application in education and teaching, achieving remarkable results.

Some scholars have applied the Chain-of-thought Technique to high school biology and chemistry education [1], and research has shown that this technique aids students in developing a holistic grasp of knowledge points, enhancing knowledge transfer and the ability to solve comprehensive problems. Other researchers have experimented with the Chain-of-thought Technique in university computer science and engineering courses [2], and the results indicate that students' learning motivation and proactiveness have been effectively enhanced, with innovative thinking abilities also significantly cultivated.

It is evident that the Chain-of-thought Technique, through deconstructing complex knowledge, establishing knowledge connections, and provoking cognitive interactions, has played a positive role. It facilitates students in constructing systematic knowledge frameworks and promotes the development of higher-order thinking abilities, gaining widespread recognition and favor in the educational community.

The rehabilitation therapy profession integrates knowledge, skills, and practical components, placing high demands on the comprehensive competencies of practitioners. Traditional teaching methods need to meet these requirements fully. Therefore, introducing the Chain-of-thought Technique into rehabilitation therapy education is highly necessary and valuable. This study aims to analyze the theoretical foundation of the Chain-of-thought Technique and focus on its specific application strategies in rehabilitation therapy education, supplemented by case analysis to illustrate its effects and provide insights and references for improving the quality of education in this discipline.

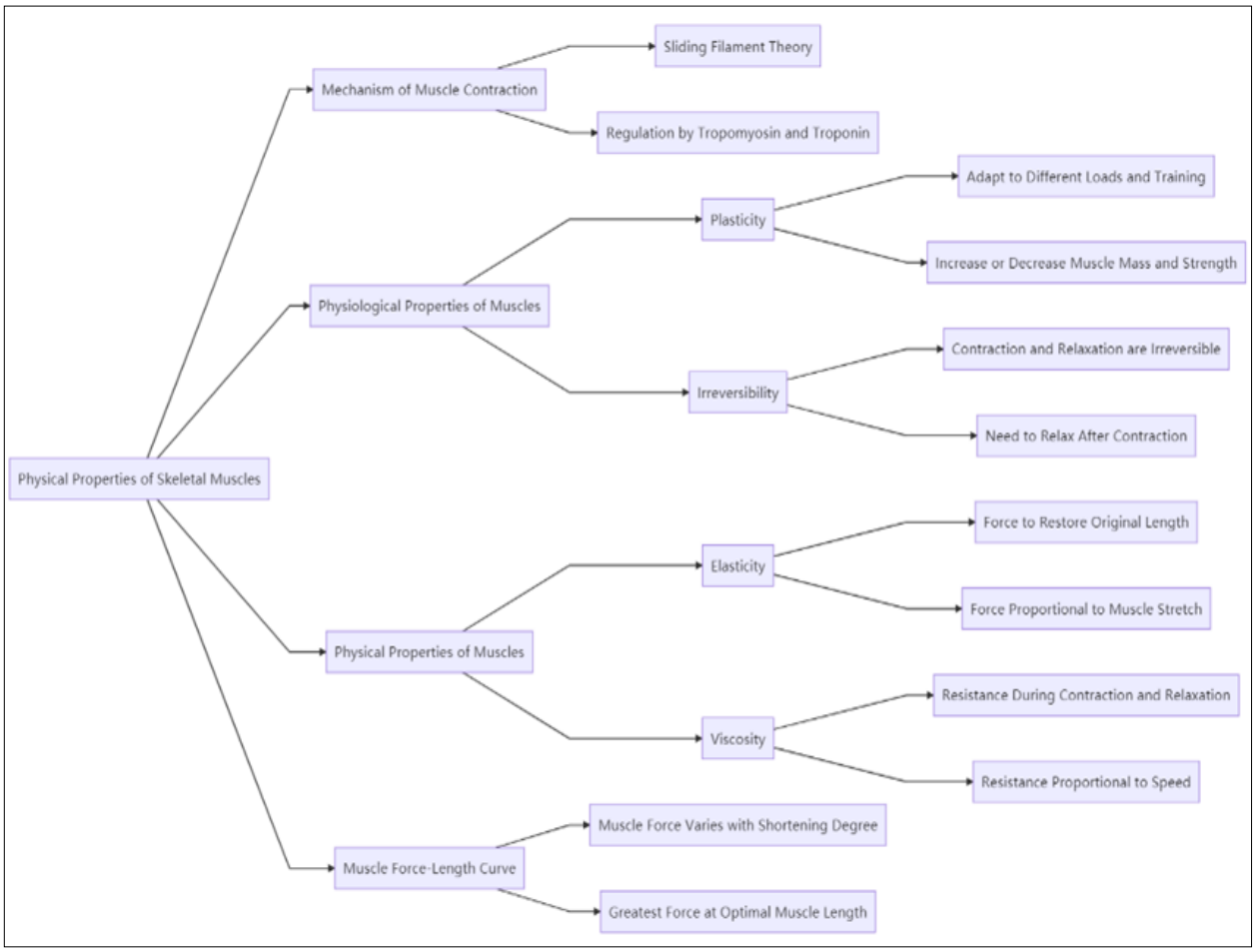

Fig 1: Physical Properties of SkeletalMuscles

Teaching design of the Chain-of-thought Tech-nique in reha-bilitation therapy

Teaching Content: How to Utilize the Physical Properties of Skeletal Muscles in Exercise（Fig.1）

1. Deconstruction of Knowledge Points

The knowledge point "Physical Properties of Skeletal Muscles" is deconstructed into:

Mechanism of Muscle Contraction (Sliding Filament Theory of Striated Muscles)

Physiological Properties of Muscles (Plasticity, Irreversibility, etc.)

Physical Properties of Muscles (Elasticity, Viscosity, etc.)

Muscle Force-Length Curve The deconstruction of the overall knowledge point "Physical Properties of Skeletal Muscles" into multiple specific sub-knowledge points embodies the characteristic of "deconstruction," which is conducive to students gradually Es-tablishing a knowledge framework. Through deconstruction, students can first grasp the essence of each knowledge point without being overwhelmed by the vast amount of knowledge, laying a foundation for subsequent learning.

2. Systematic Teaching

Following the sequence of "Mechanism of Muscle Contraction, Physiological Properties, Physical Properties, Muscle Force-Length Curve,"(Fig.2) the knowledge mentioned above is systematically taught, assisting students in establishing a comprehensive know-ledge framework. In the exposition of each knowledge point, its connection to the overall knowledge structure should Systematic teaching is conducive to students forming a comprehensive grasp of the knowledge domain "Physical Properties of Skeletal Muscles," avoiding the occurrence of fragmented knowledge or partial understanding and laying the foundation for the future flexible application of knowledge.

3. Reinforcing Memory

1. Solid memory of knowledge is a prerequisite for its application. In the classroom teaching process, teachers can adopt the following strategies to reinforce students' memory of knowledge points:
2. When explaining new knowledge points, establish connections with previously learned knowledge points, forming memory links.
3. For example, in demonstrations, post-class exercises, and other segments, design diverse practice questions to reinforce memory.Regularly conduct knowledge point tests to detect and promptly consolidate students' memory.

4. Provoking Thought

The one-way transmission of knowledge can hardly cultivate students' thinking abilities. When teaching "Physical Properties of Skeletal Muscles," teachers can raise open-ended questions such as "How to utilize muscle elasticity in strength training?" and "How to utilize the viscous characteristics of muscles in flexibility training?" to promote students' active thinking and explo-ration. This segment embodies the "provocation" characteristic, which can mobilize students' subjective initiative and help internalize theoretical knowledge into thinking abilities.

5. Deepening Understanding

Discussions can be conducted on specific issues such as "How to utilize muscle elasticity in strength training" and "How to utilize muscle viscosity in flexibility training," guiding students to deeply understand the methods of applying knowledge. In this process, teachers can provide relevant case analyses or have students design app-lication plans based on the learned theories. In-depth discussions help deepen the understanding of knowledge and improve the ability to apply knowledge flexibly.

6. Interactive Teaching

Interactive teaching between teachers and students, and among students, on relevant issues can stimulate thinking and promote internalization. For example, group discussions can be organized for students to discuss and share specific topics; teachers can also engage in teacher-student interactions on points of disagreement, jointly exploring solutions. Interaction facilitates deepening impressions, inspiring new perspectives, and embodying the concept of the Chain-of-thought Technique in practice. be
emphasized, allowin g students to recognize that these are not isolated but interconnected, forming an organic whole.

Discussion

The application of the Chain-of-thought Technique in rehabilitation therapy education holds significant theoretical significance.

1. From the perspective of knowledge construction, this technique adheres to the principles of constructivist learning theory, emphasizing that learning is a process in which learners actively construct knowledge [3]. Traditional teaching often treats knowledge as a static object for one-way transmission, overlooking the learner's role as the subject in knowledge construction. The Chain-of-thought Technique, however, decomposes complex knowledge into understandable units and then syste-matically connects them, promoting learners' gradual construction of a complete knowledge system.

The deconstruction of knowledge points is the starting point of the Chain-of-thought Technique, which reduces learning difficulties and enables learners to concentrate on mastering each knowledge unit without being over-whelmed by the vast amount of know-ledge. From the cognitive psychology perspective, the human brain is accu-stomed to starting from known simple knowledge and gradually accumulating and expanding cognitive structures. Therefore, deconstruction facilitates activating learners' existing cognitive foundations, laying the ground-work for integrating new know-ledge.

2. The Chain-of-thought Technique's systematic teaching segment reflects the learning spiral progression [4]. Mastering individual knowledge points is only the first step; knowledge points need to be interlinked and ultimately guided by teachers to converge into a complete knowledge network. The learning of each new knowledge point builds upon the existing cognitive structure, with new and old knowledge continuously integrating and systematically refining.

The rehabilitation therapy profession encompasses knowledge from various fields, such as medicine, exercise science, and psychology, with close inter-connections between knowledge points. If the teaching process lacks systematicity, it will inevitably affect the integrity of the final knowledge framework. The Chain-of-thought Technique systematically links various knowledge units according to their inherent logic, enhancing the internal coherence between knowledge points and aiding learners in forming a comprehensive professional cognitive structure.

The Chain-of-thought Technique holds significant practical value.

Rehabilitation therapy work is efficient, requiring practitioners not only to master professional theoretical knowledge but also to apply their learned knowledge to specific rehabilitation practices flexibly. The segments of reinforcing memory, provoking thought, deepening under-standing, and interactive teaching in the Chain-of-thought Technique align precisely with this training objective.

Reinforcing memory is the foundation for knowledge internalization and application.Memory is not a passive reception but a process that requires deliberate training and repeated rein-forcement. The Chain-of-thought Technique incorporates various forms of memory reinforcement, such as post-class exercises and tests, which help students form solid impressions of the learned knowledge. Simultaneously, setting open-ended questions to provoke students' thinking and mobilize their subjective initiative is also crucial. In rehabilitation, practitioners often en-counter complex problems, requiring them to possess innovative thinking and creatively transform their learned knowledge.

The segment of deepening under-standing further integrates theory and practice through case analyses, application plan designs, and other forms, guiding students to delve deeper into the practical application of knowledge [5]. The interactive teaching segment provides opportunities for students to interact and discuss with peers and mentors, promoting the collision and sublimation of thoughts. Students can gain unique perspectives and approaches through interactions, enriching their cognitive experiences.

Conclusion

The Chain-of-thought Technique, as an innovative teaching method, exhibits significant theoretical and practical value in the education of the rehabilitation therapy profession. From a theoretical perspective, this technique adheres to the fundamental principles of constructivist learning theory, emphasizing the learner's role as the subject in knowledge construction and focusing on promoting learners' active construction of a comprehensive knowledge system through deconstruction, systematization, and other processes. From a practical perspective, the segments of reinforcing memory, provoking thought, deepening understanding, and interactive teaching in the Chain-of-thought Technique align with the practical training requirements for rehabilitation therapy professionals, conducive to cultivating students' comprehensive ability to apply theoretical knowledge to practice flexibly.

The systematic application of the Chain-of-thought Technique can promote students' efficient construction and internalization of knowledge in the rehabilitation therapy profession, enhancing their ability to solve practical problems and cultivating high-quality, multi-skilled professionals to drive the development of this field [6]. In the future, the Chain-of-thought Technique holds immense potential for application in rehabilitation therapy education, warranting further research, exploration, and promotion. Additionally, the Chain-of-thought Technique can provide beneficial insights and references for the education of other professions.

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