

Journal of Sports Medicine and Allied Health Sciences: Official Journal of the Ohio Athletic Trainers Association

Volume 6
Issue 2 *JSMaHS Fall Issue 2020*

Article 5

October 2020

An Exploration of Mosston's Spectrum of Teaching Styles in Athletic Training Education.

Dominique M. Ross
University of Southern Maine, dominique.ross@maine.edu

Aimee M. Pascale
Northern Vermont University, aimee.pascale@northernvermont.edu

Follow this and additional works at: <https://scholarworks.bgsu.edu/jsmahs>



Part of the [Adult and Continuing Education Commons](#), [Curriculum and Instruction Commons](#), [Health and Physical Education Commons](#), [Rehabilitation and Therapy Commons](#), [Sports Medicine Commons](#), and the [Sports Sciences Commons](#)

Recommended Citation

Ross, Dominique M. and Pascale, Aimee M. (2020) "An Exploration of Mosston's Spectrum of Teaching Styles in Athletic Training Education.," *Journal of Sports Medicine and Allied Health Sciences: Official Journal of the Ohio Athletic Trainers Association*: Vol. 6 : Iss. 2 , Article 5.

DOI: [10.25035/jsmahs.06.02.05](https://doi.org/10.25035/jsmahs.06.02.05)

Available at: <https://scholarworks.bgsu.edu/jsmahs/vol6/iss2/5>

This Commentary is brought to you for free and open access by the Journals at ScholarWorks@BGSU. It has been accepted for inclusion in *Journal of Sports Medicine and Allied Health Sciences: Official Journal of the Ohio Athletic Trainers Association* by an authorized editor of ScholarWorks@BGSU.

An Exploration of Mosston's Spectrum of Teaching Styles in Athletic Training Education

Dominique M. Ross PhD, LAT, ATC*; Aimee M. Pascale PhD, ATC, CSCS[€]

*University of Sothern Maine, [€]Northern Vermont University

Athletic training educators teach in didactic, laboratory and clinical settings, all requiring an array of pedagogical strategies to effectively instruct students. Mosston's Spectrum of Teaching Styles is a theoretical framework to support pedagogical decision making in physical education. The purpose of the commentary is to examine teaching styles from Mosston's Spectrum in the context of athletic training education. A general introduction, review of comparative literature and practical application to athletic training education is provided for each of the eleven teaching styles. The examination and application of educational theory from other disciplines may provide athletic training educators additional resources to enhance student learning.

Keywords: *Pedagogy, Athletic Training, Teaching Styles, Physical Education*

INTRODUCTION

Athletic training is in the midst of an educational reform. As we seek to comply with new standards and transition from the professional-level bachelors to master's degree, educators should also consider new approaches to support graduate student learning preferences. The exploration and application of learning theories and teaching strategies used in other disciplines can enhance the educational skill-set of faculty and preceptors.

Throughout the athletic training literature, researchers have presented various learning theories including problem-based learning, adult learning theory, peer-assisted learning, sociocultural learning theory, case-based learning, and brain-based learning.¹⁻⁷ All of which emphasize the need for sound pedagogical approaches to improve the learning experience. The constructivist educational theory asserts that individuals learn by building and editing schemata within the mind. The act of integrating new concepts, experiences and skills to existing schemata is the construction of new knowledge.⁸ The role of the instructor is to create a series of learning experiences in which the learner can effectively integrate new and existing information. Relating concepts to prior experience and allowing students to make decisions regarding their own learning can be particularly helpful for adult learners.

In his exploration of adult learning theory, Knowles theorized a spectrum ranging from teacher-directed pedagogy to student-directed andragogy.^{9,10} Knowles found the continuum to be effective for youth and adult learners in a variety of situations.¹⁰ In his theory, pedagogy was viewed

as instructor centered education for adolescent students. In contrast, a basic assumption of andragogy acknowledged normal maturation of an individual; a transition from dependence to self-direction, an increase in rich life-experience, and a view that learning will help them achieve their greatest potential. The integration of andragogy into practice requires the instructor to place an emphasis on experiential learning and practical application.¹⁰ Also proposing a pedagogical theory grounded in a teaching spectrum, Muska Mosston described a series of teaching styles ranging from teacher-directed to student-directed.⁸ Styles in the production cluster of the spectrum have similar qualities to that of andragogy as described by Knowles.^{8,10} Expanding the educational paradigm from pedagogy to andragogy is yet another theory described as heutagogy. Heutagogy was introduced in vocational education in 2000 with a focus on self-directed learning.¹¹ This style of education is noted to stimulate deeper thinking and encourage complex problem-solving.¹² Andragogy and self-directed learning have been discussed in the athletic training literature,¹³ but absent is the exploration of how the educational theories developed by Mosston may also apply to AT education. The purpose of this commentary is to discuss Mosston's Spectrum of Teaching Styles in the context of athletic training education.

DISCUSSION

Mosston's Spectrum of Teaching Styles was first developed in 1966 to serve as a theoretical framework to guide the pedagogical decision making process for physical educators.⁹ Mosston's Spectrum has undergone refinement, but continues to provide instructors with an array of

alternative teaching styles.¹⁴ The Spectrum delineates possible teaching-learning decision structures based on the role of the educator and the role of the student, and how those roles complement intended learning outcomes. The fundamental basis of the Spectrum states that “teaching is governed by a single unifying process: decision making.”⁸ (pg. 8)

The framework of the Spectrum is built upon 6 premises: the axiom, the anatomy of any style, the decision makers, the spectrum, the clusters, and the developmental effects. The axiom refers to the idea that deliberate teaching is a result of prior decision making. As instructors, these decisions are often considered in the development of lesson plans. The anatomy is composed of three sets of decision categories: pre-impact, impact, and post-impact sets. These sets refer to decisions made prior to the teaching-learning transaction, during the teaching-learning transaction and the assessment following the teaching-learning transaction, respectively. The decision maker premise distinguishes the amount of decision-making responsibility the teacher and learners have during an interaction. The Spectrum includes eleven landmark teaching styles (A-K) clustered as reproductive, or productive, and ranging from full decision making control by the instructor, to full decision making control by the student (Figure 1).¹⁵ In the reproductive cluster, the student is asked to replicate content disseminated by the instructor. Assessments are focused on comparing the results of the student to the criteria established by the instructor. Style A-E found within this cluster are appropriate for skill acquisition and reproduction of past knowledge. In contrast, the production cluster requires the student to discover or acquire information independent

from the instructor.¹⁴ The productive cluster promotes discovery of new and existing concepts. Finally, the developmental effects of the teaching-learning transaction includes the physical, social, emotional, cognitive and moral developmental channels.⁸

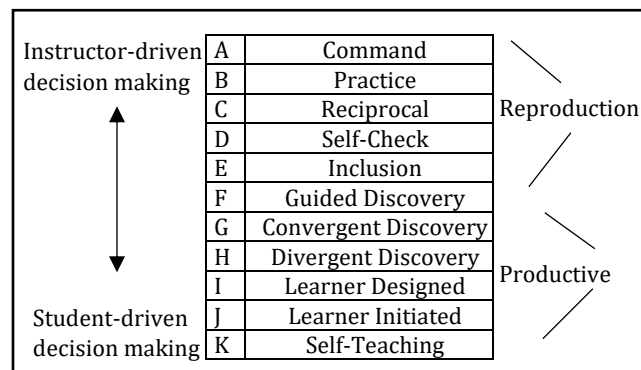


Figure 1. Mosston's Spectrum of Teaching Styles

The application and supporting evidence of this framework is robust within physical education literature.¹⁴⁻²⁸ Physical education and athletic training both integrate knowledge, skills and behaviors into curriculum, teaching concepts and physical skills to a level of proficiency.^{8,29} This commonality provides opportunities for instructors within both disciplines to integrate similar teaching strategies. Oftentimes teaching skills requires students to have time to practice and opportunities for feedback. Mosston's Spectrum allows instructors to select the best teaching style depending on the content, the needs of the students, and designated decision making responsibility during the teaching-learning transaction. The following sections provide detailed descriptions of each style within Mosston's Spectrum, comparative literature, learning and behavioral objectives (Table 1) and an application to athletic training education.

Command (Style A)

In the command style of teaching, all decisions regarding the learning experience are made by the instructor.^{8,30} The educator may provide a demonstration followed by clear, concise instructions to guide a student through a new skill or activity. The educator controls the pace, number of repetitions and tempo.³⁰ The students follow the provided cues and are not provided opportunities to make decisions.³⁰ The command style was noted to engage students in high activity times and high passive learning times, but provided little occurrence of positive-specific feedback by the instructor.¹⁸

Teaching Style	Objectives
Command	<ul style="list-style-type: none"> • Achieve accuracy and precision in performance • Adhere to a predetermined model • Achieve immediate results • Achieving conformity • Following directions on cue • Developing habits or routines • To instill safety procedures
Practice	<ul style="list-style-type: none"> • Practice independently reproducing the skill • Activate memory cognitive operations necessary for the task • Understand proficiency results from task repetition • Understand the importance of feedback for acquisition of skill proficiency • Development of independent decision making • Skill initiation • Awareness of consequences associated with decisions about the skill
Reciprocal	<ul style="list-style-type: none"> • Visualizing steps sequencing, or details of a task • Learn to use subject matter criteria to compare, contrast, and assess performance • Practice identifying and correcting errors • Learning to give and receive feedback from peers • Practice communication skills to enhance the reciprocal relationship • Expand socialization and interaction skills
Self-Check	<ul style="list-style-type: none"> • Gain independence in performing the task • Correct errors in one's task performance • Increase active time on task • Decrease reliance on instructor or peer for acquisition of skills • Gain self-awareness of one's proficiency • Develop independent and personal motivation
Inclusion	<ul style="list-style-type: none"> • Design a range of options that provide varying content entry points for all learners in the same task • Accommodate a range of performance differences • Offer opportunities for content acquisition decisions • Practice self-evaluation skills using a performance criterion • Understand the reality of individual differences in performance abilities
Guided Discovery	<ul style="list-style-type: none"> • Discover the interconnection of steps within a given task • To experience a step-by-step discovery process and develop sequential discovery skills that logically lead to broader concepts • To engage the learner in the discovery of concepts and principles representing convergent thinking • To develop an effective and affective climate conducive to engagement in the act of discovery
Convergent	<ul style="list-style-type: none"> • To discover the single correct answer to a question or the single correct solution to a problem • To discover the content sequence that, when logically linked, leads to the final response • To engage in convergent discovery and the production of the one correct response • To activate logic, reasoning, and sequenced problem-solving skills

<p>Divergent</p>	<ul style="list-style-type: none"> • To discover and produce multiple responses or solutions to a question or problem • To experience divergent production in specific cognitive operations • To view some aspects within content as developing and evolving, rather than static • To engage in the production of multiple responses that can satisfy a stimulus • To accept that an individual can approach problems or issues in different ways
<p>Self-Directed Styles (Learner-Designed Individual Program, Learner Initiated, Self-Teaching)</p>	<ul style="list-style-type: none"> • To discover, create, and organize ideas on one's own • To engage in a systematic process to explore and examine an issue • To set standards of performance and evaluation on one's own • To provide an opportunity for the learner to experience increased independence over a relatively long period of time • Choose to learn independently

Table 1. Teaching Style Objectives
 Modified from: *Spectrum of Teaching Styles (2019)*

An example of this style may be applied while teaching cardiopulmonary resuscitation to novice learners. The instructor may provide step-by-step cues, controlling the tempo and timing of compressions, breaths and patient reassessment. Students would not be permitted to move at their own pace or diverge from the provided cues.

Practice (Style B)

In the practice style of teaching, all subject matter and logistical decisions are made by the instructor. The instructor explains and demonstrates a skill in a step-by-step fashion. The role of the student is to independently practice reproduction of the skill performed by the instructor. The instructor observes the student practicing the skill, provides specific, individualized feedback, and is available to answer questions.⁸ The practice style of teaching has been found to be effective in promoting motor skill development over time in physical education students.^{17, 22} The practice style was noted to engage students in high activity times, low passive learning times, and provided high occurrence of positive-specific feedback.¹⁸ An example of the application of this style is teaching the closed basket-weave ankle taping. The instructor explains and demonstrates the skill while students observe. Students then practice the skill at their own pace, while the instructor circulates, providing individualized feedback.

Reciprocal (Style C)

In the reciprocal style of teaching, all subject matter, criteria, and logistical decisions are made by the instructor. Prior to the lesson, the

instructor creates a task sheet for the students which includes a checklist of criteria for the given task. When the lesson begins, the instructor explains and demonstrates the task in a step-by-step fashion. Students then work in pairs to practice the skill. One partner assumes the role of the doer, who performs the task. The other partner assumes the role of observer, who provides continuous feedback to the doer about the correctness of the skill, based on the task sheet. After the first practice, the observer and doer switch roles. The instructor circulates, observing the diads for appropriate use of criteria and feedback.⁸ The reciprocal style of teaching has been found to have positive effects on skill acquisition.^{22,31} Pairing with a high or low skilled peer had little effect on learning skill performance, cognitive understanding of the skill, or comfort giving and receiving feedback.³³

In athletic training education, students have been found to assess their peers with accuracy and reliability.³²⁻³³ Professionals must keep in mind the importance of choosing an effective teaching style based on consideration of multiple factors involving the task, the learners, and the learning outcomes. An example of the reciprocal style is applied in the laboratory setting while teaching a cranial nerve assessment. A task sheet with criteria for an assessment of cranial nerve function should be prepared prior to the lesson. To begin, students would be placed in pairs and the instructor would explain and demonstrate how to perform a cranial nerve assessment. Subsequently, one student would perform the cranial nerve assessment while the other serves as a model and provides continuous

feedback using the task sheet. After a complete assessment, students would switch roles. During the activity, the instructor should circulate the classroom and provide additional feedback.

Self-check (Style D)

The unique characteristic of the self-check style is the use of a self-assessment guide by students after engaging in a task. In this style the instructor makes all pre-impact decisions outlining the task and rubric for self assessment. The learner will then complete the task followed by a self assessment during the post-impact phase.⁸ This model is typically indicated for students who have been familiarized with the task and have demonstrated some degree of success. This style may be particularly helpful in meeting CAATE Professional Standard 67 requiring students "self-assess professional competence".²⁹

Self-assessment is a commonly used teaching strategy among health professions but has conflicting research regarding its reliability and accuracy.³⁴⁻³⁹ Video-based self assessment has been found to improve student satisfaction and long-term memory following a clinical skills assessment.³⁹ In contrast, other nursing research has indicated self-assessment following clinical simulation to be an unreliable measure of student performance.³⁴ Self assessment may be used in a course where students develop and refine their orthopedic evaluation skills. In this lesson, students may complete a video recorded assessment on a standardized patient. Utilizing a rubric created by the instructor, the students would review and self-assess their performance. After self-assessment, the instructor and student would engage in constructive dialogue regarding the student's process and performance.

Inclusion (Style E)

Decision making responsibility begins to shift for the inclusion style when compared to styles A-D. The instructor continues to make all pre-impact decisions prior to the start of class, creating various levels of difficulty for the student to achieve desired objectives. During the impact phase, the student is then responsible for choosing the level of difficulty they would prefer to practice.⁸ Oftentimes, the inclusion style is accompanied by a task sheet created by the instructor to outline criteria for the activity.¹⁷ This approach matches the instructional task with the ability level of the student, offering all students an

opportunity for success.¹⁷ In comparison to the reciprocal and practice styles, the inclusion style was shown to be a more effective teaching method for collegiate females learning volleyball skills. In contrast, male students learning the same skills had better outcomes using the practice style.²⁸ The inclusion style may also be combined with several other learning styles to create a specific learning experience with varying levels of difficulty.⁸

AT educators may apply the inclusion style when teaching students a core strengthening progression. Prior to the start of class, the instructor should create task sheets describing progressions of various core exercises. At the start of class the instructor should provide a visual demonstration of each exercise along with instructional cues the athletic trainer may provide a patient. Students will then have the opportunity to practice core exercises at any level of the progression. For this activity, exercises could progress from slow to fast, simple to complex, stable to unstable, low force to high force, general to specific and low to high intensity.

Guided Discovery (Style F)

The guided discovery style is the first within the productive cluster (Styles F- K). As noted, the productive cluster fosters an environment for students to gain new knowledge. Knowledge may be new to the student, instructor, profession or society.⁸ In the guided discovery style, the role of the educator is to make all subject matter decisions. The educator creates and presents a series of questions, in a logical and sequential format, intended to lead students to a predetermined response. The role of the student is to discover correct responses to the posed questions.¹⁵ Guided discovery has been presented as a teaching style used to stimulate critical thinking, problem solving and motor skill retention in physical education.³⁹⁻⁴⁰ Although not termed guided discovery, the use of strategic questioning in athletic training clinical education has been explained to stimulate critical thinking and encourages creative thinking.⁴¹ Preceptors have been observed using this type to strategic questioning to provoke student learning.⁴²

In the laboratory setting, instructors may use guided discovery to walk students through activating an emergency action plan. The instructor would describe a scene to the student and pose a question regarding their next step. The

student responds by stating their action and performing the related skill. The instructor will continue to guide the student's actions using a series of questions designed to elicit the appropriate response. If the student responds incorrectly, the instructor would continue to use questioning to guide the student to the proper action. The series of questions and answers continues until the student achieves the desired learning outcomes.

Convergent Discovery (Style G)

The role of the educator is to make decisions about the subject matter and specific logistical guidelines presented to the student. The role of the student is to produce a single solution based on the problem and content posed by the instructor.¹⁵ Within the physical education literature, the convergent teaching style was only sometimes used by teachers when compared to other productive teaching styles.²¹ Despite infrequent use, convergent discovery has been hypothesized as a method of stimulating critical thinking and may be a useful approach in athletic training education.⁴⁰

In-class activities involving case scenarios are an excellent example of convergent discovery. In this clinical reasoning activity, the instructor provides students with evaluation findings from a clinical case. The task of the student is to analyze the clinical findings to determine a clinical diagnosis. Students work through the case in a sequential manner, beginning with the medical history and proceeding through the physical assessment. After each portion of the clinical case is reviewed, students should scrutinize 3-5 possible differential diagnoses. Students are encouraged to use additional resources to analyze and interpret evaluation findings. By the end of the clinical case study, students should have a final diagnosis with supporting evidence from the case and the literature. In addition, students should be able to provide rationale for ruling out other differential diagnoses.

Divergent Discovery (Style H)

Divergent discovery is a productive teaching style. The role of the educator is to make decisions about the subject matter and specific logistical guidelines presented to the student. The role of the student is to produce one of multiple potential solutions based on the problem and content posed

by the instructor.^{8, 15} Student creativity is encouraged, within structural boundaries set by the instructor.¹⁵ Consistent with convergent discovery, the divergent discovery teaching style has also been noted to encourage creative thinking.⁴⁰ This style has been used in physical education when asking students to design new movement patterns such as creating a dance.²⁰ Similarly, in athletic training education educators may ask students to create activity specific rehabilitation exercises that deviate from generic protocols. In this example, the instructor provides students with patient details, including evaluation findings, and other information pertinent to the patient's case and care. The task of the student is to formulate an appropriately progressive rehabilitation plan for the patient. The instructor or preceptor may choose to set guidelines such as length of the rehabilitation program, types of interventions to be included, etc. A wide variety of rehabilitation plans would be considered correct.

Learner Designed Individual Program, Learner Initiated and Self-Teaching (Styles I, J and K)

The final three teaching styles shift the majority of the learning experience from the instructor to the learner. These teaching styles require the students to determine their educational needs, identify learning activities and determine the evaluation process.⁸ Opportunities for self-directed learning increase progressively from style I to K. Differences within these styles are related to the influence of the instructor on determining parameters for the subject matter.⁸ Self-directed learning has become an expectation for healthcare professionals and has been increasingly integrated into healthcare education.⁴³ Self-directed styles may be a better option to support learning in the knowledge domain and equally as effective for skills acquisition and affective behavior development when compared to more instructor-centered methods.⁴⁴ These strategies may be most appropriate in upper level courses that have flexible content, promote self-initiated learning behaviors and allow for exploration. Final year students preparing for transition to practice may benefit most from the integration of self-directed styles in courses such as graduate seminar, thesis, capstone, independent studies, and advanced clinical experiences.

In more recent literature, educators have recognized a need to explore teaching methods

appropriate for professionally qualified students who may be learning in the workplace, seeking additional training or obtaining a professional degree.^{12, 45-47} Similar to the self-teaching style, heutagogy is a form of self-directed learning that can be used with a mature student population or in clinical education.⁴⁵⁻⁴⁶ As athletic training transitions to graduate entry-level education and requires immersive clinical experiences, educators should consider student centered teaching methods in which the learner has increased decision-making responsibility.

In the learner designed individual program, the learner identifies the problem and seeks their own solutions. The role of the educator is to determine the subject matter or context of the learning experience. A thesis or capstone course requiring a student to define their own research question may best support the learner designed style. In this example, the instructor may set parameters regarding the subject area and the student selects a topic of interest. The student is also responsible for determining how the research question will be answered, will communicate their progress to the instructor and may participate in determining evaluation criteria.

The learner initiated style provides opportunity for the student to produce their own learning experience based on personal motivations and interests. This style may be most appropriate in the clinical setting where the preceptor can assume the role of the instructor. The learner produces all learning objectives, learning outcomes, procedures, and assessment criteria. The role of the preceptor is to ask questions for clarification with the intent of guiding the student to critically examine discussions or to reinforce decisions.⁸ This style may be fostered through the creation of individualized learning plan in an advanced clinical experience. The use of the SMART (specific, measureable, achievable, realistic, timely) criteria while goal setting at the start of the clinical experience paired with a self-assessment plan can improve self-directed learning behaviors.⁴⁸

The self-teaching style is completely learner developed and initiated, without instructor, preceptor or program involvement. The individual assumes the role of both learner and instructor, making all decisions, and defining all objectives.⁸

Evidence based practice has become a pillar of clinical decision making in health care and hinges on the practitioner continuing their education.⁴⁹ Self-regulated learning is an essential aspect of strategically developing methods to achieve intended learning goals.⁵⁰ The self-teaching style relies on "tenacity and the desire to learn", paralleling critical thinking dispositions such as inquisitiveness and truth seeking behaviors.^{8,51} Although the self-teaching style may not be formally integrated into athletic training education programs, these behaviors are critical to support continuing education and evidence based practice.

IMPLICATIONS

The teaching styles defined by Mosston & Ashworth can be applied to athletic training education in a variety of contexts and settings. The reproductive cluster places the decision-making responsibility on the instructor, maintaining a more traditional form of education.⁸ According to Knowles, this type of pedagogy may be appropriate for adolescent learners, and in some contexts, adult learners.¹⁰ As decision-making responsibility begins to shift to the student in the productive cluster, Mosston's teaching spectrum becomes reflective of adragogical and heutagogical teaching methods.^{10, 45-46} Utilizing these strategies with the graduate student population may improve the learning experience and enhance clinical decision-making skills.

The examples discussed by the authors illustrate pedagogical methodology that instructors may choose to incorporate into various courses within athletic training education. Educators should apply appropriate teaching styles to complement the needs of the students, course learning objectives, and boundaries of the content. Implementation of a variety of teaching styles throughout an educational unit is encouraged to support best practices for student learning.¹⁵ The teaching styles defined in Mosston's Spectrum may be applied to a variety of content and academic levels.^{8,18,22,24} Future applied research is needed to assess the how implementing Mosston's Spectrum can impact student learning and instructional effectiveness in athletic training education.

REFERENCES

1. Fry H, Ketteridge S, Marshall S. *A Handbook for Teaching and Learning in Higher Education*. New York, NY: Routledge; 2009. DOI: <https://doi.org/10.1080/03075079312331382498>
2. Guilette C. Consideration of problem-based learning in athletic training education. *Athl Train Educ J*. 2017; 12(3): 195-201. DOI: <https://doi.org/10.4085/1203195>
3. Pitney W. Continuing education in athletic training: An alternative approach based on adult learning theory. *J of Athl Train*. 1998; 33(1): 72-76. PMID: PMC1320381
4. Henning J, Weidnew T, Jones J. Peer-assisted learning in the athletic training clinical setting. *J of Athl Train*. 2006; 41(1): 102-108. PMID: PMC1421493
5. Peer KS, McClendon CR. Sociocultural learning theory in practice: Implications for athletic training educators. *J of Athl Train*. 2002; 37(4- Supplement), S136-S140. PMID: PMC164414
6. Berry DC. Case-based learning in athletic training. *Athl Train Educ J*. 2013; 8(3): 74-79. DOI: <https://doi.org/10.4085/080374>
7. Craig D. Applying brain-based learning principles to athletic training education. *Athl Train Educ J*. 2007; 2(Jan-Mar): 16-20.
8. Mosston M, Ashworth S. *Teaching Physical Education: first online edition*. Pearson Education; 2008.
9. Illeris K. *Contemporary Theories of Learning: Learning Theorists...in Their Own Words*. New York, NY: Routledge; 2018.
10. Knowles MS. *The Modern Practice of Adult Education: From Pedagogy to Andragogy*. Pub. CO: Follett; 1980.
11. Hase S, Kenyon C. From andragogy to heutagogy (internet). 2000. Ultibase, RMIT. Available from: <https://webarchive.nla.gov.au/awa/20010220130000/http://ultibase.rmit.edu.au/Articles/dec00/hase2.htm>
12. Abraham RR, Komattil R. Heutagogic approach to developing capable learners. *Med Teach*. 2017; 39(3): 295-299. DOI: <https://doi.org/10.1080/0142159X.2017.1270433>
13. Hughes BJ, Berry DC. Self directed learning and the millennial athletic training student. *Athl Train Educ J*. 2011; 6(1): 46-50.
14. Boyce B. The effects of three styles of teaching on university students' motor performance. *J of Teach in Phys Educ*. 1992; 11(4): 389-401. DOI: <https://doi.org/10.1123/jtpe.11.4.389>
15. Goldberg M, Ashworth S, Byra M. Spectrum of teaching styles retrospective. *Quest*. 2012; 64(4): 268-282.
16. Metzler M. *Instructional Models for Physical Education*. (3rd ed.). New York, NY: Routledge; 2011.
17. Byra M, Jenkins J. Matching instructional tasks to learner ability: The inclusion style of teaching. *J Phys Educ Recreat Danc*. 2000; 71(3): 26-30. DOI: [10.1080/07303084.2000.10605108](https://doi.org/10.1080/07303084.2000.10605108)
18. Byra M, Sanchez B, Wallhead T. Behaviors of students and teachers in the command, practice, and inclusion styles of teaching: Instruction, feedback, and activity level. *Eur Phys Educ Rev*. 2014; 20(1): 3-19. DOI: <https://doi.org/10.1177/1356336X13495999>
19. Chatoupis C. Implementing the learner-designed individual program style in physical education. *Strategies*. 2018; 31(2): 19-25. DOI: <https://doi.org/10.1080/08924562.2017.1418689>
20. Chatoupis C. Engaging students in designing movement: The divergent discovery style of teaching. *J Phys Educ Recreat Dance*. 2018; 89(3): 29-33. DOI: <https://doi.org/10.1080/07303084.2017.1417933>
21. Chatoupis CC. Physical education teachers' use of Mosston and Ashworth's teaching styles: A literature review. *Phys Educ*. 2018; 75(5): 880-900. DOI: <https://doi.org/10.18666/tpe-2018-v75-i5-8292>
22. Chatoupis C, Vagenas G. Effectiveness of the practice style and reciprocal style of Teaching: A meta-analysis. *Phys Educ*. 2018; 75(2): 175-194. doi: <https://doi.org/10.18666/tpe-2018-v75-i2-7920>
23. Christenson RS, Barney DC. The spectrum of teaching styles: Style E- the inclusion style. *OAHPERD Journal*. 2009; 46(1): 18-22.
24. Doherty J. Teaching styles in physical education and Mosston's spectrum. *Kentucky AHPERD*. 2010; Fall: 3. DOI: <https://doi.org/10.1080/0748763900060313>
25. Haerens L, Cardon G, De Bourdeaudhuij I, Kirk D. Toward the development of a pedagogical model for health-based physical education. *Quest*. 2011; 63(3): 321-338. DOI: <https://doi.org/10.1080/00336297.2011.10483684>
26. Kirby S, Byra M, Readdy T, Wallhead T. Effects of spectrum teaching styles on college students' psychological needs satisfaction and self-determined motivation. *Eur Phys Educ Rev*. 2015; 21(4): 521-540. DOI: <https://doi.org/10.1177/1356336X15585010>
27. Sanchez B, Byra M, Wallhead TL. Students' perceptions of the command, practice, and inclusion styles of teaching. *Phys Educ Sport Pedagog*. 2012; 17(3): 317-330. DOI: <https://doi.org/10.1080/17408989.2012.690864>
28. Zeng HZ, Leung RW, Liu W, Bian W. Learning outcomes taught by three teaching styles in college fundamental volleyball classes. *Clin Kinesiol*. 2009; 63(1): 1-6. ISSN: [08969620](https://doi.org/10.1080/08969620).
29. Commission on Accreditation of Athletic Training Education. *2020 Standards for Accreditation of Professional Athletic Training Programs: Master's Degree Programs*. 2018; <https://caate.net/wp-content/uploads/2019/02/2020-Standards-Final-2-20-2019.pdf>. Accessed 06/12/2019.
30. Thomson WC. Mosston's styles of teaching: A review of command style. *VAHPERD Journal*. 2009; 30(2): 20+.
31. Ernst M, Byra M. Pairing learners in the reciprocal style of teaching: influence on student skill, knowledge, and socialization. *Physical Educator*. 1998; 55: 24-37.
32. Engelmann JM. Peer assessment of clinical skills and professional behaviors among undergraduate athletic training students. *Athl Train Educ J*. 2016; 11(2): 95-102. DOI: <https://doi.org/10.4085/110295>
33. Marty MC, Henning JM, Willse JT. Accuracy and reliability of peer assessment of athletic training psychomotor laboratory skills. *J Athl Train*. 2010; 45(6): 609-614. DOI: <https://doi.org/10.4085/1062-6050-45.6.609>
34. Baxter P, Norman G. Self-assessment or self-deception? A lack of association between nursing students' self-assessment and performance. *J Adv Nurs*. 2011; 67(11): 2406-2413. DOI: <https://doi.org/10.1111/j.1365-2648.2011.05658.x>
35. Colthart I, Bagnall G, Evans A, et al. The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Med Teach*. 2008; 30(2): 124-145. DOI: <https://doi.org/10.1080/01421590701881699>
36. Gordon M. A review of the validity and accuracy of self-assessment in health professions training. *Acad Med*. 1991; 66(12): 762-769.

37. Ward M, MacRae H, Schlachta C, et al. Resident self-assessment of operative performance. *Am J Surg.* 2003; 185(6): 521-524.
DOI: [https://doi.org/10.1016/S0002-9610\(03\)00069-2](https://doi.org/10.1016/S0002-9610(03)00069-2)
38. Yoo MS, Son YJ, Kim YS, Park JH. Video-based self-assessment: Implementation and evaluation in an undergraduate nursing course. *Nurse Educ Today.* 2009; 29(6): 585-589.
DOI: <https://doi.org/10.1016/j.nedt.2008.12.008>
39. Derri V, Pacht M. Motor skills and concepts acquisition and retention: a comparison between two styles of teaching. *Revista Internacional de Ciencias del Deporte.* 2007; 9(3): 37-47. <http://www.cafyd.com/REVISTA/00904.pdf>
40. Pill S, SueSee B. Including critical thinking and problem solving in physical education. *J Phys Educ Recreat Danc.* 2017; 88(9): 43-49.
DOI: <https://doi.org/10.1080/07303084.2017.1367741>
41. Barnum MG, Guyer MS, Levy LS, Willeford KS, Sexton P, Fincher AL. Questioning and feedback in athletic training clinical education. *Athl Train Educ J.* 2009; 4(1) :23-27.
42. Barnum MG. Questioning skills demonstrated by approved clinical instructors during clinical field experiences. *J Athl Train.* 2008; 43(3): 284-292.
DOI: <https://doi.org/10.4085/1062-6050-43.3.284>
43. Sandars J, Walsh K. Self-directed learning. *Educ Prim Care.* 2016; 27(2): 151-152.
DOI: <https://doi.org/10.1080/14739879.2016.1149956>
44. Murad MH, Coto-Yglesias F, Varkey P, Prokop LJ, Murad AL. The effectiveness of self-directed learning in health professions education: A systematic review. *Med Educ.* 2010; 44(11): 1057-1068. DOI: <https://doi.org/10.1111/j.1365-2923.2010.03750.x>
45. Bhojru J, Hurley J, Neilson GR, Ramsay M, Smith M. Heutagogy: An alternative practice based learning approach. *Nurse Educ Pract.* 2010; 10(6): 322-326.
DOI: <https://doi.org/10.1016/j.nepr.2010.05.001>
46. Canning N. Playing with heutagogy: Exploring strategies to empower mature learners in higher education. *J Furth High Educ.* 2010; 34(1): 59-71.
DOI: <https://doi.org/10.1080/03098770903477102>
47. Chacko T. Emerging pedagogies for effective adult learning: from andragogy to heutagogy. *Arch Med Heal Sci.* 2018; 6(2): 278-283. DOI: <https://doi.org/10.4103/amhs.amhs>
48. Chitkara MB, Satnick D, Lu WH, Fleit H, Go RA, Chandran L. Can individualized learning plans in an advanced clinical experience course for fourth year medical students foster self-directed learning? *BMC Med Educ.* 2016; 16(1): 1-6. DOI: <https://doi.org/10.1186/s12909-016-0744-8>
49. Steves R, Hootmant JM. Evidence-based medicine: What is it and how does it apply to athletic training? *J Athl Train.* 2004; 39(1): 83-87.
50. Sandars J, Walsh K. Self-directed learning. *Educ Prim Care.* 2016; 27(2): 151-152.
DOI: <https://doi.org/10.1080/14739879.2016.1149956>
51. Facione PA, Carol AS, Facione NC, Gainen J. The disposition toward critical thinking. *J Gen Educ.* 1995; 44(1): 1-25.