ATHLETIC TRAINING EDUCATION JOURNAL

www.natajournals.org
ISSN: 1947-380X
DOI: 10.4085/1404293

ORIGINAL RESEARCH

Signature Pedagogies in Athletic Therapy Education

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Context: Developing an understanding of the signature pedagogies in athletic therapy education may help to promote greater pedagogical development opportunities and encourage meaningful reflection for educators.

Objective: To gain an understanding of the perceived level of pedagogical knowledge in Canadian athletic therapy educators and how they developed such knowledge.

Design: Sequential explanatory mixed-methods.

Setting: Seven undergraduate Canadian Athletic Therapists Association–accredited institutions

Patients or Other Participants: Twenty-one athletic therapy educators (16 women, 5 men) responded to the initial questionnaire; 15 athletic therapy educators (11 women, 4 men) participated in individual phone interviews.

Main Outcome Measure(s): An initial questionnaire was designed to explore general pedagogical knowledge in athletic therapy educators and how familiar participants were with different teaching strategies. Emergent trends from these questionnaires were used to design a specific interview schedule. Phone interviews further explored the institutional, personal, student, and cultural factors that affected the selection of different pedagogical approaches. Findings from the questionnaires and interviews were combined to identify participants' pedagogical approaches to teaching in an athletic therapy setting.

Results: A pedagogical distinction was observed, dividing the sample into 2 groups. One group used a traditional, passive lecturing format, and the other, more innovative pedagogies. Educators who followed traditional teaching practices were less likely to know about different pedagogies or understand how these strategies could contribute to more effective instruction. The other group of educators appreciated the use of different pedagogies and explained how different teaching strategies could be incorporated to enhance learning in the athletic therapy curriculum.

Conclusions: On the basis of these findings, Canadian athletic therapy educators would benefit from more formalized pedagogical training and/or development. These formalized opportunities could familiarize educators with innovative pedagogical strategies while also preparing them with the necessary skills required to self-evaluate their own teaching approaches.

Key Words: Pedagogy, pedagogical development, innovative teaching strategies

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Full Citation:
King CD, MacKinnon G. Signature pedagogies in athletic therapy education. *Athl Train Educ J.* 2019;14(4):293–304.

Signature Pedagogies in Athletic Therapy Education

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KEY POINTS

- Given that the ultimate goal of athletic therapy programs is to develop competent individuals who are able to think critically when dealing with real-life situations, athletic therapy educators need to be cognizant of different pedagogical strategies and evaluate the impact that these strategies have on student learning.
- We observed a pedagogical distinction in the current sample of athletic therapy educators, dividing the sample into educators who followed more traditional, passive lecturing format, and others who used more innovative pedagogies.
- On the basis of these findings, we recommend athletic therapy educators to participate in more formalized pedagogical training and/or development to become familiar with more innovative pedagogical strategies that can enhance competence development and student learning.

INTRODUCTION

In health profession programs, including athletic therapy, students are exposed to diverse educational settings that invoke a range of instructors with varying educational approaches and objectives. Students are often expected to "acquire knowledge" by listening passively to lectures from experienced professionals, while mastering skills and developing professional competence through simulated," instructor-supported laboratories. These students also typically participate in a type of "master-apprenticeship" system of learning by working under certified athletic therapists (ATs) external to their institution in various clinical and field settings.[1] "Master" therapists advise, direct, and oversee the student in various practical settings and help prepare the student for professional life after school as well as for the national certification examination. It seems reasonable to suggest that students would benefit if athletic therapy instructors were apprised of a range of effective pedagogies that shape student learning and ongoing professional development.[2] However, many athletic therapy educators and placement supervisors do not have formalized backgrounds in teaching and learning theory and therefore may be unaware of the range of pedagogical strategies to enhance learning and improve competency development.[3,4] Furthermore, little research is available on how athletic therapy educators develop their personal teaching styles and the types of factors that influence these teaching practices.[5]

To understand how professional programs prepare their students for life after schooling, it is important to explore the specific teaching and learning processes that are incorporated into the curriculum and practicum placements.[6] Shulman[6] defined these processes as the signature pedagogies of the profession, the fundamental ways in which future practitioners are educated for their new profession. Traditionally, health profession educators develop their signature pedagogies and general teaching philosophies by using a combination of their own experiences as a learner and through general conceptions about teaching acquired from personal experiences and observations.[7] In many of these health profession programs, there is a tacit assumption that expertise in clinical practice automatically translates into teaching competence.[5,7] There is an expectation that if clinicians have, for example, 30 years of experience working in the field, then they will automatically be considered effective educators in that profession. This perception is undoubtedly due to the nature of athletic therapy education in that a coaching of skills can typically occur one-on-one, in which case the experience, rather than the specific lecturing skills, of the educator is paramount.[8] However, researchers suggest that mere content expertise does not necessarily correlate with teaching excellence.[9–13]

All faculty members in higher education are expected to be effective educators, especially in professional programs such as athletic therapy.[14] However, many faculty members do not receive specific pedagogical development through their terminal degrees, where the focus is often placed on research training and development.[5] Therefore, these educators often fashion an approach to teaching that reflects their previous experiences as a student.[7,15]

Developing an understanding of the signature pedagogies in athletic therapy education may help to promote meaningful reflection among educators regarding their personal pedagogical knowledge and assist in the promotion of greater pedagogical development opportunities for athletic therapy educators. The purpose of this study was to gain a better understanding of the perceived levels of pedagogical knowledge in Canadian athletic therapy educators. This study also explored the signature pedagogies used in athletic therapy education and the factors that affected the selection of different pedagogical strategies.

METHODS

Research Design

Complex phenomena, such as athletic therapy education, cannot be explored exclusively through a positivist research lens because it is not "out there" in an objective world, just waiting to be discovered, measured, or predicted. Rather, this phenomenon is culturally and historically mediated by the different educators, students, curricula, and academic institutions.[16] Athletic therapy educators have unique teaching styles, teaching philosophies, differing levels of teaching experience, diverse educational backgrounds, and extensive clinical backgrounds, none of which can be controlled in a single research study. Therefore, the context of athletic therapy classrooms is far too complex to measure outcomes of an intervention study purely from a statistical perspective that relies on causal comparison of variables. On the basis of these assumptions, we used an interpretivist paradigm to explore the research questions.

A sequential explanatory mixed-methods approach[17] was used to explore athletic therapy educators' preferred pedagogical

Table 1. Demographic Characteristics of Participants

Participant Pseudonym	Questionnaire/ Interview	Age Range, y	Teaching, y	Terminal Degree	Type of Athletic Therapy Institution
ATEd-1	Both	51 or older	13	Master's	College
ATEd-2	Both	41–50	10	Master's	College
ATEd-3	Both	41–50	15	PhD	College/University
ATEd-4	Both	41–50	7	Master's	College
ATEd-5	Both	41–50	24	PhD	University
ATEd-6	Both	51 or older	13	Master's	College
ATEd-7	Both	41–50	11	PhD	University
ATEd-8	Both	41–50	7	Master's	College
ATEd-9	Both	31–40	5	Master's	University
ATEd-10	Both	51 or older	38	PhD	University
ATEd-11	Both	31–40	6	Master's	University
ATEd-12	Both	41–50	12	Master's	College
ATEd-13	Both	41–50	15	Master's	University
ATEd-14	Both	20–30	5	Master's	University
ATEd-15	Both	41–50	12	PhD	University
ATEd-16	Questionnaire	51 or older	NA	PhD	University
ATEd-17	Questionnaire	41–50	NA	Master's	University
ATEd-18	Questionnaire	31–40	NA	Master's	University
ATEd-19	Questionnaire	41–50	NA	Master's	University
ATEd-20	Questionnaire	51 or older	NA	PhD	University
ATEd-21	Questionnaire	31–40	NA	Master's	College

Abbreviation: NA, not applicable; PhD, doctoral degree.

strategies during athletic therapy courses. In this type of mixed-methods methodology, each source of data was considered to be "one piece of the puzzle," contributing to our overall understanding of the phenomenon in question.[18] Multiple data sets also helped to corroborate the results to ensure an account that was rich, comprehensive, and well developed.[19]

Setting

This study involved participants from 7 Canadian Athletic Therapists Association (CATA)–accredited institutions, 5 universities, and 2 colleges. Institutional ethics review board approval was obtained from each accredited institution before the study commenced.

Participants

We used a purposeful sampling procedure in this study.[20] All full-time educators with the Certified Athletic Therapists (CAT[C]) designation (26 educators in total) from 7 CATA-accredited institutions were invited to participate in our study. An introductory email was sent to the program director at each CATA-accredited institution, outlining the purpose of the research and expectations from study participants. These directors were then asked to forward the information to their full-time athletic therapy faculty. All directors were asked to send a follow-up email to eligible educators, 1 month after the original message. A total of 21 (16 women, 5 men) eligible educators voluntarily responded to the initial questionnaire (81% response rate), whereas 15 educators (11 women, 4 men) participated in the follow-up individual phone interviews (58% response rate). Descriptive demographic characteristics of each participant are provided in Table 1.

Data Collection Procedures

Questionnaire. We designed an online questionnaire to explore general pedagogical knowledge in athletic therapy educators, as well as the most frequently used teaching strategies (Table 2). The questionnaire was housed on the researchers' university online survey site, and a link to this site was provided to all eligible athletic therapy educators. To summarize, participants were asked a series of questions about general pedagogical knowledge, most frequently used teaching strategies, and using technology for educational purposes.

The first page of the questionnaire acted as the informed consent by outlining the purpose of the research, providing the researchers' contact information, and identifying the terms of participation (eg, reserving the right to withdraw participation, understanding the nature of participation). Each athletic therapy educator consented to participate in the study by following the webpage cues. All questionnaires were completed anonymously, but participants were asked to provide an email address if they were interested in being contacted for an individual interview. These email addresses were stored in a separate database so they could not be matched with specific questionnaire responses.

Participants responded to statements by using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The questions from this questionnaire were adapted from existing questionnaires by Archambault and Crippen[21] and Schmidt et al[22] to make them more applicable for an athletic therapy–specific context. Questions from the original questionnaires were created for a general education curriculum (eg, science, mathematics), so these were changed to reflect the specific topic areas from the athletic therapy curriculum (eg,

Table 2. Summary of Questionnaire Responses

Question	Mean (/5) ± SD
I enjoy using technology as a part of my teaching	4.29 ± 0.70
I am aware of the technologies that are commonly used in teaching in my discipline	3.48 ± 0.91
I feel confident in my knowledge about key concepts in my teaching area of specialization	4.71 ± 0.45
I sometime have difficulty sequencing the topics in my teaching	2.38 ± 1.17
I feel confident in the range of teaching strategies I use in the classroom	4.19 ± 0.66
I feel confident that I use the latest resources to support the content of my teaching	3.99 ± 0.66
I am aware of the significant research contributors in my area of specialization	3.76 ± 0.92
I regularly use case-based learning approaches in my teaching	3.90 ± 0.81
I feel confident in my use of Socratic teaching methods	3.52 ± 1.10
I feel confident in my use of instructional scaffolding methods	3.67 ± 0.99
I feel confident in my use of peer-assisted learning techniques with my students	4.00 ± 0.76
I feel confident in my ability to assess student performance in the classroom	4.57 ± 0.49
I feel confident in my ability to adapt my teaching methodology based on student performance	4.29 ± 0.93
I feel confident in my ability to adapt my teaching to different learning styles	4.29 ± 0.55
I am confident in my ability to assess student learning using multiple measures	4.14 ± 0.64
I am confident in my ability to use a wide range of teaching approaches in a classroom setting	4.24 ± 0.53
I find it difficult to identify subject area misconceptions in my students	2.24 ± 0.92
I feel confident selecting the appropriate teaching strategy for specific learning objectives	4.00 ± 0.76
I feel confident designing assessments for my area of specialization	4.33 ± 0.64
I rarely work with students specifically on their problem-solving skills	1.86 ± 0.77
I make a conscious effort to integrate my content area within other courses of the student's program	4.24 ± 0.68
I feel confident in choosing appropriate technologies for my teaching objectives	3.86 ± 0.89
I find it easy to abandon a particular technology that is not working well in my teaching	3.27 ± 0.94
When I become aware of technologies used in teaching of other disciplines, I am able to see ways that leverage that technology for my own objective purpose	3.52 ± 0.85
I find it difficult to find instructional technologies for my teaching specialization	2.57 ± 1.14
I rarely think about how a particular technology impacts the way that I teach	2.52 ± 1.05
I rarely think about how students learning in my area of specialization is impacted by my teaching strategy choices	2.10 ± 1.02
I feel confident in choosing instructional technologies that motivate students to learn	3.76 ± 0.92
I feel confident in choosing technologies that make the content easier to understand	3.81 ± 0.91
I feel pressure from students to use more technology in my teaching	2.90 ± 1.31
I feel that I could better capitalize on technologies to further enhance my teaching	3.90 ± 0.61

orthopaedic assessment, rehabilitation). After modifying the questionnaire, it was reviewed by 2 athletic therapy educators who were experienced in questionnaire development and mixed-methods research. Both individuals had held academic appointments for at least 20 years and had numerous experiences using and designing questionnaires for research. To assess for face validity, these experts were asked to review the objectives of the study as well as each specific question on the questionnaire. On the basis of this expert review, no changes were made and the same instrument was used in the current study.

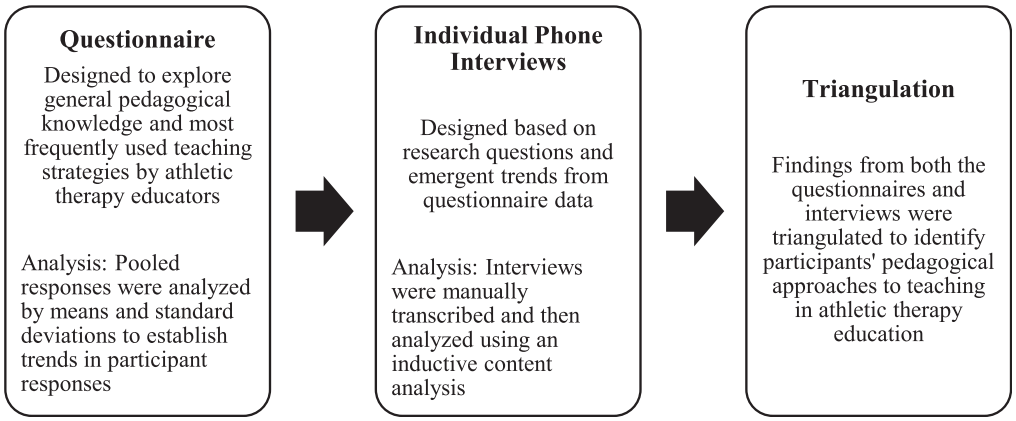
The data collected from these questionnaires were pooled together and analyzed in Microsoft Excel 2016 (Redmond, WA), by way of means and standard deviations, to establish trends in responses only. The quantitative results were not used to objectively measure the amount of pedagogical knowledge in athletic therapy educators; rather, the findings were used to identify trends that were further deconstructed during the qualitative interviews. All questionnaires were completed anonymously so individual responses could not be matched up to compare with interview transcriptions.

Individual Interviews. At the end of the questionnaire, all educators were invited to participate in a 60-minute individual phone interview, following a standardized, open-ended format. The semistructured interviews tended to be more conversational in an effort to clarify the intent of questions.[23] Per Patton,[19] the interview schedule was developed on the basis of the research questions and the emergent trends from the questionnaire data (Table 3). For example, a trend emerged from the questionnaire responses that athletic therapy educators felt confident in the range of teaching strategies that they used in the classroom. Further probing questions were asked to explore what these specific strategies were and what factors affected such pedagogical decisions. All individual interviews were audio-recorded (with permission from participants), manually transcribed, and then sent to the participant to review for clarity or inaccurate transcription.

Data Analysis and Trustworthiness

Data analysis (Figure) followed an interpretivist approach as described by Thomas et al.[24] By following this approach, it was assumed that athletic therapy educators constructed their personal pedagogical approach by interpreting and interacting with their own unique educational environment. It was also assumed that this approach was shaped by various professional, (eg, expectations from the CATA), institutional, student, personal, and cultural interactions. Findings from both the questionnaires and interviews were combined to identify participants' pedagogical approaches to teaching in

Figure. Description of data analysis.



athletic therapy education and why they fashioned such an approach. As previously described, the questionnaire responses were initially analyzed to identify trends that were then further deconstructed during the individual phone interviews.[25] To develop a deeper understanding of these emergent themes, an inductive content analysis approach (as proposed by Hahn[26]) was used to analyze the interviews. The first step was to manually transcribe all available interview data to gain an initial appreciation for what was said and how it was said.[24] The next step involved reviewing the transcriptions and developing general coding categories to organize the findings (eg, example of pedagogical strategy). The final step of the coding approach involved studying these generally coded categories and developing highly refined themes, also known as *thematic coding*.[27] The transcriptions were then read again to find significant quotations that supported the general research agenda and any emerging themes or subthemes.

When analyzing the interview data, trustworthiness was established through member checks and peer review. After all the interviews were transcribed, coded, and analyzed, member checks were performed with 3 randomly selected interview participants to confirm the themes that emerged from the data.[25] During this member-checking process, all transcripts were emailed to the 3 selected participants, and interpretations of the themes were also shared. Follow-up 30-minute phone interviews were scheduled with each member-checking participant to have further discussion on the transcripts and emerging themes.[28] These participants were asked to respond with any incorrect or misleading informa-

Table 3. Interview Question Schedule

1. What is your educational background and job title at your institution?
2. How long have you been teaching within an athletic therapy accredited program?
3. What courses do you currently teach?
4. How did you learn how to teach?
5. What is the most frequent critique you would receive of your teaching?
6. Describe your personal teaching philosophy.
7. The findings from the questionnaire showed that AT educators have a self-perceived high level of content knowledge. Why do you think that AT educators consider themselves to be content experts?
8. The responses from the initial questionnaire also showed that AT educators feel confident with the range of teaching strategies that they use in the classroom. What specific teaching strategies do you use most often?
9. Do you reflect on these strategies to see if they can be improved upon? If so, how often? What specific factors do you consider? Do you think these methods are effective when you consider tangible learning outcomes?
10. How do you incorporate different teaching strategies into different courses? What factors impact these pedagogical decisions?
11. Another trend in the survey showed that lecture-based learning appears to be the most commonly used strategy in AT education, followed by problem-based learning and then case-based learning. Why do you think lecture-based is the most popular in AT education?
12. Do you see an evolution in the use of lecture-based learning in AT education?
13. PBL and CBL were also popular choices. Why do you think these have gained popularity?
14. How can different teaching strategies be used to deliver CATA competencies?
15. What does effective technology integration mean to you?
16. When do you use technology in your teaching? More specifically, how do you incorporate technology into your teaching? Give specific examples.
17. Where do you think is the most potential for technology to enhance learning in Athletic Therapy?
18. Hoes does technology change the way you think about teaching? Are you apprehensive or excited to try new things?

Abbreviations: AT, athletic therapist; CATA, Canadian Athletic Therapists Association; CBL, case-based learning; PBL, problem-based learning.

Table 4. Themes and Subthemes Describing Pedagogical Knowledge in Athletic Therapist (AT) Educators

Theme	Subthemes
1. AT Educators as Content Experts	Rationale for Description as Content Experts: • Experience with Course Content • Continuing Education Requirements • Concurrently Practicing as an AT
2. Development of Pedagogical Knowledge in AT Educators	Pedagogical Development Through: • Reflecting on Experiences as an AT student • Formalized Pedagogy Development • Informal Professional Development
3. Pedagogical Differences Between Traditional and Innovative AT Educators	Traditional Lecture-Based vs Innovative Strategies Factors Impacting Pedagogical Decisions

tion, but no major changes were made to the transcripts or themes. Peer review was also used with the second author to review the initial interview schedule and to discuss the initial thematic analysis as proposed by the lead author. Again, no major changes were made to any of the themes or subthemes.

RESULTS

As an alternative to discussing noteworthy findings from an isolated questionnaire, findings from both the questionnaires and interviews were combined to describe the perceived levels of pedagogical knowledge in Canadian athletic therapy educators. This process was also used to identify the signature pedagogies of athletic therapy education and the factors that impacted the selection of different pedagogical strategies. A summary of the questionnaire results is provided in Table 2.

Three main themes emerged from the questionnaires and interviews: (1) athletic therapy educators identifying themselves as content experts, (2) development of pedagogical knowledge in athletic therapy educators, and (3) pedagogical differences between traditional and innovative athletic therapy educators. These main themes and accompanying subthemes are presented in Table 4, followed by further discussion.

Athletic Therapy Educators as Content Experts

When asked to describe themselves as educators, the sample of athletic therapy educators portrayed themselves as content experts. This presumption was corroborated in the questionnaire results when the participants agreed with the statements "I feel confident in my knowledge of key concepts in my area of specialization" (mean response of 4.71/5 = *strongly agree*) and "I feel confident that I use the latest resources to support the content of my teaching" (mean response of 3.99/5 = *agree*). When educators were further questioned during the interviews regarding why they considered themselves to be content experts, 3 main subthemes emerged: experience with the course content, professional continuing education requirements, and concurrently practicing as an AT.

Experience with Course Content. The sample of athletic therapy educators described experience with the course content as the most important attribute for developing a high level of content knowledge. In addition, graduate school experience, previous athletic therapy experiences, and previous teaching experiences were all considered essential factors in building a foundational content base. The sample of athletic therapy educators were found to be an experienced teaching group (the average number of years teaching at a CATA-accredited institution was 13.1 years; range, 6 to 38 years), and many of them taught the same courses year after year. Hence, as one educator stated,

> *When you teach the same course in multiple years it allows you to review the curriculum, update with new topics, and read literature in that particular area. Therefore, you get to increase your own knowledge in that particular subject area by preparing for each year. (ATEd-15)*

Continuing Education Requirements. The second subtheme that emerged was linked to the continuing education requirements of the athletic therapy profession. To maintain certification as certified ATs, CATA members must accumulate 21 continuing education units every 3 years.[29] These units, in the form of courses, conference attendance, or other recognized forms of professional development, ensure that members remain up-to-date with research on current practice-oriented trends.[29] Eleven of the educators mentioned this requirement for continuing education units during the interviews and commented on how this obligation for maintaining certification assisted in keeping up-to-date with current topics, concepts, theories, and procedures related to course content. When asked, "Why do you think that athletic therapy educators consider themselves to be content experts?" one participant responded,

> *Most of our professional development is related to athletic therapy–specific content. We go to conferences, complete webinars, volunteer on committees, do continuing education courses, all to provide service to our profession but also to stay current with new modalities, techniques, and treatment philosophies. I think this is really important because students are going to ask questions about the newest rehab modalities, so as an educator I need to be aware of what is out there. (ATEd-2)*

Another participant added,

> *We get constant emails with continuing education opportunities from our national association and they are almost always associated with new assessment techniques or rehabilitation approaches. There are not as many opportunities for "how to improve my teaching" or "how to use different technologies in the classroom." So I guess most ATs just continue to develop themselves as therapists first and hope that translates over to effective teaching after. (ATEd-8)*

Concurrently Practicing as an Athletic Therapist. The third subtheme that emerged from this sample was related to maintaining content knowledge by continuing to practice in athletic therapy. Some educators held dual positions at their accredited institutions by teaching courses in the program as well as working as an AT with the varsity teams (providing assessments and treatments for those athletes). Other educators assessed and treated individuals in clinical environments outside of their postsecondary environment. Finally, many of the educators also traveled to major provincial, national, and international competitions (eg, Canada Games, Olympics, or Pan-American Games) to work as ATs with core health care service teams. All these experiences working as ATs outside of the classroom environment allowed the educators to constantly practice and apply the theory and techniques that were being taught inside the athletic therapy classrooms. To illustrate this, one educator commented,

> *By continuing to practice as an AT, I am able to keep up with the newest treatment techniques and therapeutic modalities because I want to use what is best for my client. Then I get to turn around and teach these same techniques to my students. (ATEd-12)*

Development of Pedagogical Knowledge in Athletic Therapy Educators

Pedagogical knowledge is defined as a deep understanding about the processes and practices of teaching and learning and how it encompasses overall educational purposes, aims, and values.[30] This unique form of knowledge includes knowing about effective techniques or methods to be used in the classroom, selecting different strategies based on the nature of the target audience.[30] The selection of different strategies is often influenced by various cognitive, social, and developmental theories of learning as well as how students construct knowledge, acquire skills, and develop habits of mind.[30]

As demonstrated in the questionnaire results, the majority of athletic therapy educators perceived their level of pedagogical knowledge to be high. This was corroborated through respondents agreeing with the following statements in the questionnaire: (1) "I feel confident in my ability to assess student performance in the classroom" (4.57); (2) "I feel confident in my ability to adapt my teaching methodology based on student performance" (4.29); (3) "I feel confident in my ability to adapt my teaching to different learning styles" (4.29); and (4) "I am confident in my ability to assess student learning using multiple measures" (4.14). When the athletic therapy educators were further questioned about how they acquired or maintained this level of pedagogical knowledge, 3 central subthemes emerged: reflecting on experiences as an athletic therapy student, formalized pedagogy sessions, and informal professional development.

Reflecting on Experiences as an Athletic Therapy Student. Ten athletic therapy educators from the sample commented on their personal experiences as a student and how those experiences led them to develop similar strategies and philosophies as their favorite teachers. Providing an illustrative example, one educator commented,

> *I learned how to teach through the school of hard knocks. I tried to emulate my favorite teachers and then experienced, reflected, and altered my teaching practices for the next time. Good teachers constantly think about how they can improve as an educator. (ATEd-5)*

Another educator described this process:

> *After being a student for so long you see many different styles. You start with one that you think works for you, but if that doesn't work then you try a different one that you have been exposed to in the past. I think of all my favourite professors and also the ones that I did not like. And I think about what it is that I liked and disliked. Then I try to fashion my approach based on these reflections. (ATEd-7)*

Formalized Pedagogy Development. The second subtheme that emerged was associated with formalized professional development courses. Nine of the athletic therapy educators interviewed participated in some type of formalized pedagogy session during their careers as educators. These developmental sessions covered an assortment of topics including teaching in a college setting; introduction to innovative teaching methods; connecting effective teaching methods to match differing learning styles; summative and formative assessment; and cooperative learning. Among the different CATA-accredited institutions, there was a wide range of formalized pedagogy opportunities (eg, professional development seminars/courses) readily available for athletic therapy educators. The greatest difference was observed between CATA programs that were housed in college settings and those housed in universities. The college environments with CATA programs provided many opportunities for athletic therapy educators to develop their pedagogical knowledge. For example, at one of the colleges all new faculty members were initially hired on 2-year probationary contracts that required them to participate in the "Teaching and Learning Academy" on campus. This academy assisted with the transition into a full-time teaching role by enhancing pedagogical knowledge and teaching skills. In comparison, athletic therapy educators from the other university programs (excluding 1 institution that recently transitioned from a college to a university) did not appear to have the same level of access to pedagogical knowledge courses and, if they did, the educators had to actively pursue these courses on their own time. For example, one educator (ATEd-9) employed at a university stated, "There are no professional development sessions that I am aware of about effective teaching strategies or other topics related to pedagogy. Or at least I haven't heard of any at my institution."

Informal Professional Development. The final subtheme regarding how athletic therapy educators acquired or maintained pedagogical knowledge was through informal professional development. Some of the educators interviewed were very passionate about improving themselves as teachers and they described themselves as lifelong learners of pedagogy. According to one educator (ATEd-5), "I read a lot about pedagogy and experiment in the classroom. I like to learn about a new strategy or way to approach a topic, think about how it would fit with my course, and then implement it." Another participant added,

> *For me personally, I enjoy reading and discussing these things with other educators. Topics like: how do you do a good review with a student? How do you give effective feedback to a student? What methodologies help a student to progress? Then the beauty part of teaching every year is that you get the*

opportunity to try it out . . . to see what goes well, what doesn't, what would I do differently next year? It's a constant journey towards being a more effective educator. (ATEd-1)

Although the perception of pedagogical knowledge was ranked by participants to be quite high in the questionnaires, conflicting findings emerged from the interviews. After analyzing responses, a pedagogical distinction was observed between 2 groups of athletic therapy educators: (1) the majority of educators (10 of those interviewed) who appeared to follow the "traditional" didactic postsecondary teaching practice of articulating theory in a lecture format followed by demonstrating practical skills in laboratory settings; and (2) the other 5 educators who used more innovative teaching strategies and pedagogies and were more likely to experiment in the classroom. Educators who followed the traditional lecturing practice were less likely to know about different pedagogies/teaching methods and have conversations about how these strategies could contribute to more effective instruction. One educator (ATEd-8) rationalized this lack of pedagogical knowledge by commenting, "In athletic therapy-accredited institutions, most educators are ATs first and educators second. So, we teach how we were taught and do not really know any other way." In comparison, the other group of educators appreciated the use of different pedagogies and understood how using different strategies could enhance learning and benefit athletic therapy students. For example, one educator spoke about the introduction to student reflection as a teaching strategy and shared a personal journey of designing, implementing, and evaluating reflection into athletic therapy classes. According to this educator,

To me, students need to be able to reflect on their own learning. What they know. What they do not know. And through the years I needed to work with the students so that they knew how to do an actual reflection of learning. What really made it meaningful to you? Was it how it was presented? Was it the way you interacted with the patient? There may be many things along the way that can add meaning to the topic at hand. (ATEd-5)

This constitutes 1 example from the group of educators who were clearly more knowledgeable in pedagogy and displayed risk-taking behaviors with respect to experimenting with teaching and learning.

Pedagogical Differences Between Traditional and Innovative Athletic Therapy Educators

During the interviews, the educators were asked to discuss their personal teaching philosophies and to describe different teaching strategies most commonly applied in their classes. Again, a pedagogical distinction became apparent during these discussions. The same 5 educators described as having a greater level of pedagogical knowledge were able to openly discuss different teaching strategies and demonstrated a clear understanding of how and when to effectively implement a particular strategy. By comparison, the other 10 traditional educators were not as comfortable in these conversations. For example, when discussing case-based learning as a potential teaching strategy, the educators with a higher level of pedagogical knowledge were able to provide different contexts for how they would integrate these activities into their classes, whereas the other educators considered case-based learning to be simply using a case scenario as an example to add context to the content being taught.

The 5 educators who demonstrated a higher level of pedagogical knowledge identified many different pedagogical strategies that they commonly used in athletic therapy classrooms, including: case-based learning; flipped classrooms[31]; student critical-reflection activities; narratives and storytelling; self-directed learning; and cooperative learning. Another important component of effective teaching is knowing what teaching strategies fit the course content and understanding when to incorporate different teaching strategies.[32] The athletic therapy educators with a greater level of pedagogical knowledge were able to have deeper conversations on selecting different pedagogical strategies while describing the factors that affected these pedagogical decisions. For example, one educator described the personal pedagogical growth of transitioning from using a content-driven approach to placing a greater emphasis on the teaching and learning:

Before, the discipline was the most important thing and I was very content driven. Now I just want to guide and encourage learning and use a more active-learning approach. I want to ensure that learning becomes real to my students. (ATEd-6)

This educator continued by describing the use of specific active-learning examples such as flipped classrooms, reflective activities that stimulated critical thinking, case-based learning, and problem-based learning. When deciding upon what teaching strategies to use, this educator said,

The content of the course drives my selection of teaching strategies. There are some courses (eg, therapeutic modalities) that from a safety perspective, I need to teach important pieces of content first so that the students know the basics, so they do not harm a patient. In these cases, I still use the traditional lecture to get the content across. But in other courses (eg, assessment courses), it is useful to implement more flipped classroom models, or learner-centered activities to really allow the students to build upon their prior experiences and to integrate what they may have seen at a placement or in other classes. (ATEd-6)

Two other athletic therapy educators who represented a higher level of pedagogical knowledge also made additional comments about Bloom's Taxonomy[33] and described how these principles guided their selection of different teaching strategies. These educators stated that different strategies were used when the objective was to develop higher levels of learning within Bloom's Taxonomy (analysis, synthesis, or evaluation) compared with stimulating the lower levels of knowledge (rote memorization) and comprehension. When the goal was to encourage higher levels of learning, more student-centered teaching strategies were implemented such as case-based learning, problem-based learning, and student reflection. When the course objective was focused on knowledge acquisition and factual recall, the traditional lecture-based approach was typically used.

DISCUSSION

The purpose of this study was twofold. First, data were gathered to gain a better understanding of the perceived levels of pedagogical knowledge in Canadian athletic therapy educators and how this knowledge was developed. Second,

data were also gathered to explore the signature pedagogies used in athletic therapy education and the factors that affected the selection of different strategies. After analyzing the findings from the questionnaire and interviews, 3 main themes emerged: (1) athletic therapy educators identifying themselves as content experts, (2) development of pedagogical knowledge in athletic therapy educators, and (3) pedagogical differences between traditional and innovative athletic therapy educators. These findings offer a better understanding of pedagogical development in Canadian athletic therapy educators and the signature pedagogies of athletic therapy education as well as identifying pedagogical differences between traditional and innovative educators.

Athletic Therapy Educators as Content Experts

The sample of athletic therapy educators in this study described themselves as content experts. Participants felt that much of their professional development focused on athletic therapy–specific content instead of how to improve as teachers. As one participant (ATEd-8) stated, "most educators are ATs first and educators second," explaining why most of their ongoing development is related to increasing athletic therapy–specific content knowledge. Participants went on to describe how this content knowledge was continuously developed by teaching the same courses each year, through content-specific continuing education, and concurrently practicing as an AT.

Similar findings were discovered in the literature. Rich[34] found that some athletic therapy educators have a background in pedagogy and many others do not. This research also described how most graduate programs emphasize content knowledge rather than pedagogical knowledge, reinforcing the classification of medical professional educators as subject matter experts. Leone et al[35] also suggested that most athletic therapy professionals are trained in specific content areas during graduate preparation, but not always in teaching or pedagogy. Therefore, athletic therapy educators are often left to "learn on the job" while navigating the theory, skills, values, attitudes, and normative behaviors related to teaching. These issues are also apparent in other medical professions.[7,36]

The vast majority of medical educators (including the profession of athletic therapy) appear to be professionals with limited formal pedagogical training, despite extensive experiences in education.[37] Unfortunately, having been in many classrooms does not necessarily make a person an expert in education. Our results demonstrate that there are athletic therapy educators with increased levels of pedagogical knowledge who are more innovative in their teaching approaches. There appears to be a lack, however, of collegial awareness of what these individuals know and how different pedagogical strategies can contribute to an athletic therapy program. Therefore, athletic therapy educators with limited levels of pedagogical knowledge could benefit from seeking more formalized pedagogical training opportunities to gain a better understanding of how different modes of teaching may enhance student learning and competency development.

Development of Pedagogical Knowledge in Athletic Therapy Educators

Our findings suggested a wide range of pedagogical knowledge in Canadian athletic therapy educators. Most educators appeared to fashion their teaching approaches through reflection of their personal experiences as athletic therapy students. Our results also identified conflicting results between perceived levels of pedagogical knowledge from questionnaire responses and actual levels of pedagogical knowledge as determined by the detailed conversations during individual interviews. It became clear that the sample of athletic therapy educators was divided into 2 groups: (1) the majority of educators who followed a traditional didactic teaching approach and (2) an innovative group who were more experimental in the classroom. This innovative group of athletic therapy educators incorporated different pedagogical strategies and appreciated how these modes of learning contributed to more effective instruction.

Few researchers have previously investigated the types of pedagogical strategies commonly used by athletic therapy education programs in Canada and the United States. Mensch and Ennis[38] examined the types of pedagogical strategies used in 5 athletic training education programs in Pennsylvania, Virginia, and Maryland. More specifically, these researchers focused on identifying the pedagogical strategies recognized by students as being essential components to their success in an accredited curriculum. The results of this study showed that the most beneficial teaching strategies were using case-based learning; creating authentic athletic training experiences through observational or hands-on activities; and using collaborative activities. Although these strategies were considered to be the most valuable by the sample of students, the majority of athletic training educators at these institutions still predominately used the passive, didactic lecture method as their preferred pedagogy.

Mazerolle and Yeargin[39] investigated how various pedagogical tools were used by American athletic training programs to promote a deeper understanding of anatomy and its relationship to athletic injuries. These researchers found that the most effective pedagogical strategies for teaching anatomy to athletic training students were: case-based learning, concept mapping, collaborative assignments, injury simulations, and univocal-dialogic discourse. These authors also suggested that effective educators should introduce learners to a variety of instructional methods to allow for differences in learning styles and preferences.

As demonstrated by the innovative group of athletic therapy educators in the current study, educations should continue to explore the use of different pedagogical strategies in their unique contexts. This recommendation to implement multiple pedagogical strategies is duly noted in the literature.[40–42] However, when choosing pedagogical approaches, an educator needs to consider a number of important factors including the impact that these different strategies have on student learning.[43,44]

Pedagogical Differences Between Traditional and Innovative Athletic Therapy Educators

The final theme highlighted the pedagogical differences between the groups of traditional and innovative athletic therapy educators. The innovative educators appeared to be very passionate about improving themselves as teachers and described themselves as lifelong learners of pedagogy. The traditional group of educators used a more passive mode of

learning and were less likely to experiment with using different pedagogical strategies.

Given that the majority of athletic therapy educators in this sample shared the same belief, the traditional passive lecture-based learning environment appeared to be the signature pedagogy of Canadian athletic therapy education. The majority of educators used a passive mode of learning that offered a body of knowledge to the students in a sequence of lectures and asked them to internalize that knowledge outside of class on their own time. Separate laboratory sessions were also used to teach hands-on practical skills. During the interviews, athletic therapy educators were asked why a "stand and deliver" mode of teaching was the most commonly used in the athletic therapy profession. Responses included (1) "Lecturing is an easy way to get a lot of information across to a lot of people. Because you can put a PowerPoint presentation together, stand up in front of the room and blast information at people." (ATEd-13); (2) "Lecturing is how the students expect their education to be. They pay to have someone teach them the material as opposed to being mainly self-directed." (ATEd-4); and (3) "People teach the way they were taught. It is scary for some people to go outside their comfort zone to look for innovative strategies, or the risk of trying something new." (ATEd-10).

Historically, this mode of learning has commonly been seen in other medical professions, including medicine,[45] nursing,[46] and physiotherapy.[47] However, in recent years the trends in these medical professional programs have shifted from using a passive teacher-centered learning approach to more constructivist student-centered learning approaches.[47] Active, constructivist approaches facilitate learning by tasking students to think critically about the course content, focusing on deeper learning processes instead of rote memorization.[48] Given that the ultimate goal of athletic therapy programs is to develop competent individuals who are able to think critically when dealing with real-life situations, athletic therapy educators need to be cognizant of different pedagogical strategies and evaluate the impact that these strategies have on student learning.[49] On the basis of our findings, some athletic therapy educators appeared to be more progressive than others in implementing different strategies, but all educators should be more willing to experiment in the classroom to improve instruction.[50] According to current notions of constructivism,[51] athletic therapy educators are encouraged to assume the stance of "reflective practitioner" and in doing so, evaluate their rationale for their current approach to teaching. Educators could also benefit from familiarizing themselves with what else is being done in other athletic therapy classrooms (and in other medical professions as well) and modify their pedagogical practices to enhance instruction, student learning, and competency development.[51,52]

Recommendations for Athletic Therapy Educators

On the basis of this research, it is important for athletic therapy educators to examine how learning is fostered in their own institutions. Educational research that works in one context does not necessarily work in all contexts. However, athletic therapy educators should be aware of the pedagogical shift that is occurring in other medical professions such as medicine. Many medical schools have reacted to changes in medical knowledge, preferred learning styles of students, and effective teaching practices by decreasing the amount of factual knowledge that is passively lectured to students.[53] As an alternative, medical educators are implementing constructivist student-centered approaches that emphasize self-directed learning and problem-solving skills, leading to more effective instruction.[53] Similar pedagogical changes are also on the horizon for the athletic therapy profession. According to a consensus statement released by a CATA education task force, by the year 2020, all CATA-accredited programs will be expected to have a plan in place to move their individual program designs to a competency-based educational model.[54] In this type of learning model, students work on developing 1 core competency at a time and only move on to others when they have demonstrated mastery of the original competency.[55] Therefore, to be progressive in their approach, athletic therapy educators need to be aware of innovative pedagogical strategies and be able to evaluate how these new strategies fit into a competency-based model and their overall teaching philosophy.[55]

Limitations and Future Directions

Several limitations were noted within this study. Although trustworthiness was addressed through member checking and peer-reviewing, additional methods could be used in the future. Multiple-analyst triangulation involves multiple researchers coding and reviewing themes, to develop a consensus and eliminate researcher bias, improving overall trustworthiness of the qualitative data.[56] In addition, the findings from this study involved athletic therapy educators' self-perceived level of pedagogical knowledge. There were no mechanisms in place to observe athletic therapy educators in their natural teaching environment to see how they teach and how they implement different teaching strategies in the classroom. Future research could directly observe classroom interactions and evaluate athletic therapy educators' pedagogical knowledge in actual practice. Furthermore, students could be included in a study to explore the effectiveness of these pedagogical strategies on student learning.

It is also important to note that athletic therapy education in Canada will be undergoing a pedagogical shift in the near future. By the year 2020, all CATA-accredited programs will be expected to have a detailed plan in place to move their program structure toward a competency-based educational model.[54] Therefore, pedagogical approaches may evolve due to this curricular shift. Future research should explore how student-centered pedagogies are compatible with a competency-based educational model and how this shift affects the level of pedagogical knowledge in athletic therapy educators.

Finally, the research described herein highlights the potential for innovative pedagogies to enhance athletic therapy education in Canada. Furthermore, current learning theory recommends complementary active modes of learning that promote a balance between foundational knowledge acquisition, practical skill application, and clinical skill development.[57] Future research should continue to explore the effectiveness of these innovative pedagogies while inquiring how to develop pedagogical knowledge in athletic therapy educators.

CONCLUSIONS

Three main themes emerged from this study: (1) athletic therapy educators identify themselves as content experts, with

little formalized pedagogical development; (2) development of pedagogical knowledge in athletic therapy educators, which was often attributed to informal pedagogical experiences; and (3) the pedagogical divide between traditional athletic therapy educators (those who followed a passive lecture-based approach) and innovative athletic therapy educators who were more likely to incorporate different pedagogical strategies. On the basis of the findings from this study, we think Canadian athletic therapy educators would benefit from more formalized pedagogical training and/or education. These formalized opportunities could familiarize educators with diverse and innovative pedagogical strategies while also equipping them with the necessary skills required to self-evaluate their own teaching approaches.

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