

Assessing Aquatic Education in Entry-Level Curricula for Physical Therapists and Physical Therapist Assistants in the United States

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Background and Purpose: In 1993, Morris and Jackson found that 62% of surveyed physical therapist (PT) and physical therapist assistant (PTA) programs taught some form of aquatic physical therapy (AqPT) in their curriculum. No studies have re-examined AqPT curriculum trends with the advancement to the Doctor of Physical Therapy degree, expansion of PT and PTA programs, or since a global pandemic. This study investigated trends of AqPT instructional methodologies and potential future directions within academic settings.

Methods: This study utilized a survey to query all Commission on Accreditation in Physical Therapy Education PT and PTA schools in the United States. Descriptive statistical analysis and qualitative content analysis were performed.

Results: The survey response rate was 16.5% (n = 40) for PT and 28.6% (n = 98) for PTA programs. Results showed 75% of PT programs and 95.9% of PTA programs reported teaching AqPT content within the academic curriculum. Common teaching methodologies included lectures and laboratory sessions. Pool access and time within the curriculum continued to be major barriers for 32.6% of respondents.

Discussion: This study had a comparable response rate to the previous study and demonstrated a potential increase in the number of curricula that contain AqPT. Most respondents taught some AqPT in their curriculum but were limited in time to meet the competencies for aquatic physical therapy practice. Although the COVID-19 pandemic significantly impacted AqPT by restricting access to pools, the majority of respondents had returned to their in-pool lab experience.

Conclusion: Post pandemic curriculum trends have normalized for AqPT curricula at most schools teaching AqPT. The inclusion of AqPT at entry-level PT and PTA programs appears valued despite challenges. (*J Aquat Phys Ther* 2025;33:17–24)

Key words: aquatic therapy, curriculum, physical therapy education

Aquatic physical therapy (AqPT) is a modality that utilizes active treatment techniques directed by a physical therapist (PT) or physical therapist assistant (PTA) to attain therapeutic effects.¹ This differs from passive modalities like whirlpool and active techniques like aquatic exercise and aqua aerobics.¹ During the early years of the PT profession, the use of AqPT was pivotal in growing physical therapy practice in the United States (US) with its popularity waxing and waning more recently.¹ In the US, AqPT has lagged in popularity and research compared to other specialty areas which are likely due to cost, popularity, and access. However, many rehabilitation

facilities utilize AqPT and there is research to support the efficacy in many different patient populations.^{2–7}

In 1993, Morris and Jackson surveyed all 126 PT and 127 PTA programs in the US assessing the inclusion of AqPT in their curricula.¹ They reported a 59% response rate and that 62% of respondents taught AqPT for their respective entry-level degrees. However, the landscape of PT education has drastically changed since their survey. The first graduating physical therapists with a doctorate occurred in 1996, and since 2016 all accredited PT programs in the US graduated with doctorate level degrees.⁸ Between 1994 and 2022, there have been 133 new PT programs and 258 new PTA programs, both of which include hybrid programs.⁹ Recently revised standards from the Commission on Accreditation in Physical Therapy Education do not state specific requirements for AqPT.¹⁰ The Federation of State Boards of Physical Therapy (FSBPT) no longer specifically mentions aquatic interventions as a specific topic area in the PT or PTA content outline as they did in the early 2000's.^{11–13} Furthermore, the coronavirus pandemic has affected many institutions and could have led some programs to reassess their curricula.

Journal of Aquatic Physical Therapy
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No financial support was received for this research.

Brian Maloney is a current board member of the Aquatic Physical Therapy.

DOI: 10.1097/PXT.000000000000047

Considering these factors, it was time to reexamine PT and PTA education regarding the use of AqPT.

Morris and Jackson discussed entry level PT and PTA education, suggesting it is only one possible way clinicians are introduced to AqPT.¹ They also note when programs are challenged to add additional content that AqPT could be deemed as non-essential.¹ It was hypothesized that the prevalence of AqPT has likely decreased since the Morris and Jackson study due to the substantial growth in entry-level knowledge and the development of both the physical therapy diagnostic process and specialized practice areas within the physical therapy field. The purpose of this paper was to quantify current AqPT curricula in accredited PT and PTA programs. Secondary objectives were to identify barriers limiting AqPT in the curriculum, and potential trends related to AqPT education.

METHODS

On February 14, 2023 a Qualtrics based survey was emailed to all program directors of CAPTE accredited institutions (268 PT programs and 343 PTA). The survey was available through the 12th of April 2023 instructions were included for the program director or the person with the most knowledge of the AqPT curriculum to complete the survey. This purposive sampling was used to intentionally recruit participants to ensure validity of information gained through the survey process. Reminder emails were sent 2 times following the initial email. To prevent multiple responses from a single program, a unique link was sent to each program director, restricting submissions to one response per program. Additionally, to limit non-response bias, the recruitment letter included explicit instructions to complete the abbreviated survey for those that do not include AqPT in their curriculum (shorter survey due to the branching logic bypassing questions about their curriculum and jumps to the limitation section) This research was documented in accordance with the Checklist for Reporting of Survey Studies.¹⁴ The questionnaire was developed by the researchers and partially modeled after the initial study by Morris and Jackson. The survey consists of 5 questions related to demographics and up to 9 base questions on educational methodology, barriers, and future plans for AqPT (see addendum). Some of the questions incorporated branch logic to gather more specific information on these topics. Several experts in aquatics or survey design reviewed the survey prior to distribution. This study was approved by the Institutional Review Board to gather contemporary information on the topic.

RESULTS

A total of 611 surveys were sent with a total of 18 undeliverable emails (17 PT, and 1 PTA programs). The data was extracted and analyzed using Qualtrics software, Version [1.2024] of Qualtrics. Additional analysis utilized SPSS software [version 29.0.0.0] to calculate the Mann-Whitney U values. The survey response rate was 23.3% (n = 138) with a completion rate of 94.9%. This

TABLE 1
Demographics of All Survey Participants

	PT Program (n = 40)	PTA Program (n = 98)
Institution setting—location		
Rural	9 (22.5%)	29 (29.6%)
Suburban	12 (30.0%)	32(34.7%)
Urban	19 (40.0%)	32 (32.7%)
Institution setting—type		
Private	24 (60.0%)	25 (25.5%)
Public	13 (32.5%)	70 (71.4%)
Curriculum delivery		
Traditional in-person	35 (87.5%)	88 (89.8%)
Hybrid/virtual	1 (2.5%)	5 (5.1%)
Both tracts offered	1 (2.5%)	2 (2.0%)
Number of semester of PT school		
Less than eight	(7.5%)	-
Eight	(25.0%)	-
Nine	(60.0%)	-

resulted in specific response rates of 16.5% (n = 40), and 28.6% (n = 98) for PT and PTA programs respectively. Demographic data is presented in Table 1. Overall AqPT curricula inclusion was 89.9% (n = 124) but skewed towards PTA programs at 95.9% (n = 94) and PT programs at 75% (n = 30).

Most programs, 69.4% (n = 86), utilized AqPT in one academic course while 29.0% (n = 36) threaded AqPT in their curriculum across multiple courses. Delivery methods primarily focused on lectures with 95.1% (n = 118) of respondents utilizing this delivery method, and 71.0% (n = 88) utilizing an in-pool experience. A full breakdown of methods by hours taught can be found in Table 2.

The most frequent time associated with all curricular methods was in the 1 to 3.75 hours of instruction. Time spent for teaching in each methodology was comparable between PT and PTA programs. The exception to this was skills competency checkoffs and simulation-based activities, which were only included in PTA schools. Physical properties of water were taught at 96.7% (n = 120) of programs that teach AqPT. These were closely followed at 96.0% (n = 119) teaching indications and contraindication for AqPT, 86.3% (n = 107) for the physiology of immersion, and 75.8% (n = 94) teaching therapeutic exercises in the aquatic setting. Complete content within academic programs may be found in Table 3. Core faculty were reported as responsible for teaching AqPT in 85.6% (n = 99) while guest lectures made up 29.3% (n = 34) and adjunct faculty teaching in 12.9% (n = 15) of programs.

A total of 31.2% (n = 43) of the institutions surveyed reported barriers to teaching AqPT content in their program. Of these, 6 of them were not currently teaching AqPT. Additionally, 12 institutions answered they were unsure if there were barriers to teaching AqPT with one of those not currently teach AqPT content. Access to a pool was reported as a barrier at 88.4% of institutions that reported current barriers to teaching AqPT. This was followed by pool access due to financial limitations at 69.8% (n = 30), limited time within the

TABLE 2

AqPT Delivery Method Frequency by Time for the 124 Respondents Who Included AqPT in Their Curriculum

Delivery Methods	PT or PTA	Programs Including This Methodology	Less Than 1 Hour	1-3.75 Hours	4-6.75 Hours	7 Hours or More
Lecture	PT	26 (86.7%)	2 (7.7%)	16 (61.5%)	7 (26.9%)	1 (3.8%)
	PTA	92 (97.9%)	14 (15.2%)	63 (68.5%)	13 (14.1%)	2 (2.2%)
In-pool lab	PT	20 (66.7%)	1 (5.0%)	17 (85.0%)	1 (5.0%)	1 (5.0%)
	PTA	68 (72.3%)	2 (2.9%)	55 (80.9%)	11 (16.2%)	-
Videos	PT	7 (23.3%)	4 (57.1%)	2 (28.6%)	1 (14.3%)	-
	PTA	32 (34.0%)	21 (65.6%)	9 (28.1%)	2 (6.3%)	-
Classroom lab	PT	3 (10.0%)	1 (33.3%)	2 (66.7%)	-	-
	PTA	11 (11.7%)	3 (27.3%)	5 (45.5%)	2 (18.2%)	-
In-pool checkoffs or competency	PT	-	-	-	-	-
	PTA	6 (6.4%)	3 (50.0%)	2 (33.3%)	-	-
Simulation	PT	-	-	-	-	-
	PTA	3 (3.2%)	1 (33.3%)	-	-	-
Other ^a	PT	1 (3.3%)	1 (100%)	-	-	-
	PTA	6 (6.4%)	1 (16.7%)	1 (16.7%)	-	-

^aOther included case studies, guest speakers, assignments, and research projects.

curriculum was reported at 60.5% ($n = 26$), and access to an AqPT expert was reported at 32.6% ($n = 14$). A further breakdown of these percentages can be found in Figure 1.

The COVID-19 pandemic caused a disruption of AqPT curricula at 51.5% ($n = 138$) of programs which included one program not currently teaching AqPT. For these programs, pool labs were not accessible for 97.1% ($n = 73$), with 2.8% ($n = 2$) of schools losing access to their AqPT expert. Fifty-two programs reported no changes to their AqPT curricula during the COVID-19 pandemic. At the time of the survey, 4.3% ($n = 6$) of all programs were still affected by COVID-19 restrictions.

Looking at future trends of AqPT in PT and PTA education, 90.8% ($n = 125$) of respondents reported no planned changes in contact hours devoted to AqPT. Five PT programs and 4 PTA programs plan to increase hours. Returning to the pool or seeking use of a pool was how 8 of the 9 respondents report increasing future content time. A total of 2.3% ($n = 3$), which included one PT program and 2 PTA programs, plan to decrease hours. All 3 programs who were decreasing hours reported they will be eliminating the in-pool lab.

The final question asked all participants to rate the following statement, “Aquatic physical therapy education is needed for entry-level practice,” on a 5-point Likert scale. The results of this question can be found in Figure 2. A Mann-Whitney U test revealed a statistically significant difference in the mean rank response between those that included AqPT in their curriculum and those that do not ($P \leq .001$).

DISCUSSION

Currently, there is limited research regarding the topic of AqPT in PT and PTA programs. Despite the addition of multiple programs and growth of curricular content in specialty areas, it appears that more PT and PTA programs include APT within their curriculum than 30 years ago. The inclusion of AqPT changed from 62%¹ to nearly 90% in this survey. The hours spent teaching these topics may also have increased compared to 1993. Both increases may reflect the original survey finding that 51% of their respondents had AqPT in their curriculum for less than 5 years.¹ This change may also be reflected in the change of who teaches the material which has shifted from 50%

TABLE 3

Curricular Content of the 124 Programs that Include AqPT

Curricular Content	PT ($n = 30$)	PTA ($n = 94$)	Total ($n = 124$)
Physical properties of water	27 (90.0%)	93 (98.9%)	120 (96.7%)
Indications	27 (90.0%)	92 (97.9%)	119 (96.0%)
Contraindications	27 (90.0%)	92 (97.9%)	119 (96.0%)
Physiology of immersion	24 (80.0%)	83 (88.3%)	107 (86.3%)
Therapeutic exercise in the pool	22 (73.3%)	72 (76.6%)	94 (75.8%)
Billing	7 (23.3%)	33 (35.1%)	40 (32.3%)
Sports specific AT	8 (26.7%)	24 (25.5%)	32 (25.8%)
Adaptive swimming	3 (10.0%)	18 (19.1%)	21 (16.9%)
Water rescue and patient safety	3 (10.0%)	17 (18.1%)	20 (16.1%)
Pool operation and management	2 (6.7%)	16 (17.0%)	18 (14.5%)
Collaborations with other disciplines	1 (3.3%)	9 (9.6%)	10 (8.1%)
Other: intro to aquatic professional associations	1 (3.3%)	-	1 (0.8%)

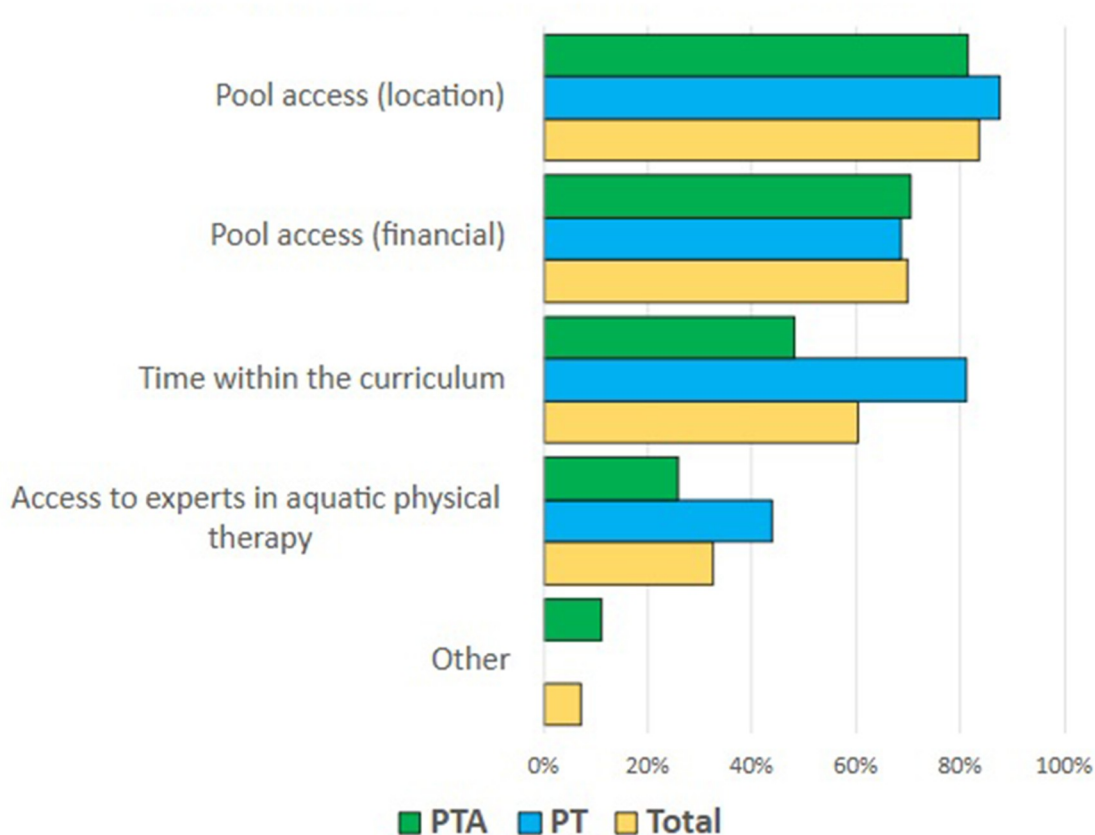


Fig. 1. Limitations by percentage of the 43 institutions reporting barriers to teaching AqPT in their curriculum.

full-time faculty¹ to 85.9% in this study. It also reflects a continued acknowledgement, by educators, of the utility of AqPT as a useful modality for physical therapy treatment.

Our sample characteristics were evenly distributed compared to national PT and PTA program demographics when looking at the type of institution (private vs public), and location characteristic of the school (urban, suburban, rural). When comparing the methods, content, and time spent teaching the topics, our results were like the Morris and Jackson study¹ with 2 exceptions. The first was a decrease in teaching aquatic treatment techniques which was previously more commonly taught at 94%¹ down to 73.3%. The second exception, as previously noted was more core faculty members now teach the AqPT curricula. The latter could reflect some therapeutic exercise textbooks including AqPT as a chapter, or the formation of the Academy of Aquatic Physical Therapy. Many schools reported limitations with accessing a pool which were related to financial or location limitations. The type of school or location did not relate to the limitations with pool access. Another barrier to teaching AqPT was time within the curriculum, which was similar to the Morris and Jackson findings.¹ There was no significant difference with the number of semesters of a PT program when comparing those who felt time constraints for AqPT within their curriculum. Overall, it appears that more schools are teaching AqPT content, but the average hours dedicated to AqPT has not likely increased since 1993.¹ This is likely due to the adding of specialty content to PT and PTA

curriculum, thus keeping time within the curriculum as a common barrier.

It is not possible from the data to determine the exact total time spent and compare between PT and PTA curriculum. However, it is probable that PTA schools have more time to teach aquatic content. This is supported by a lower number of PTA programs reporting limitations of time within the curriculum as well as more PTA programs utilizing time-intensive methodologies such as skills competency checkoffs and in-pool simulations.

While the COVID-19 pandemic affected AqPT curricula at most PT and PTA institutions across the US, lab content was affected more than didactic components. Most programs have since returned to pre-pandemic AqPT curricula, while a few others report having to use more video than hands on lab skills. Looking at future trends, most programs have no plans to alter curricular design or content hours of AqPT. A small percentage of schools do plan to change by increasing or decreasing the time spent. Those planning to change had not yet returned to pre-pandemic AqPT curricula. Three programs plan to eliminate AqPT lab from their curriculum. Morris and Jackson discussed this potential phenomenon in their paper.¹ They stated when academic programs are required to add content to already saturated curriculums, that lesser valued curriculum is eliminated. Many programs did report feeling the time pressure to deliver AqPT content. We speculate that this pressure along with changes during the pandemic with less time spent on

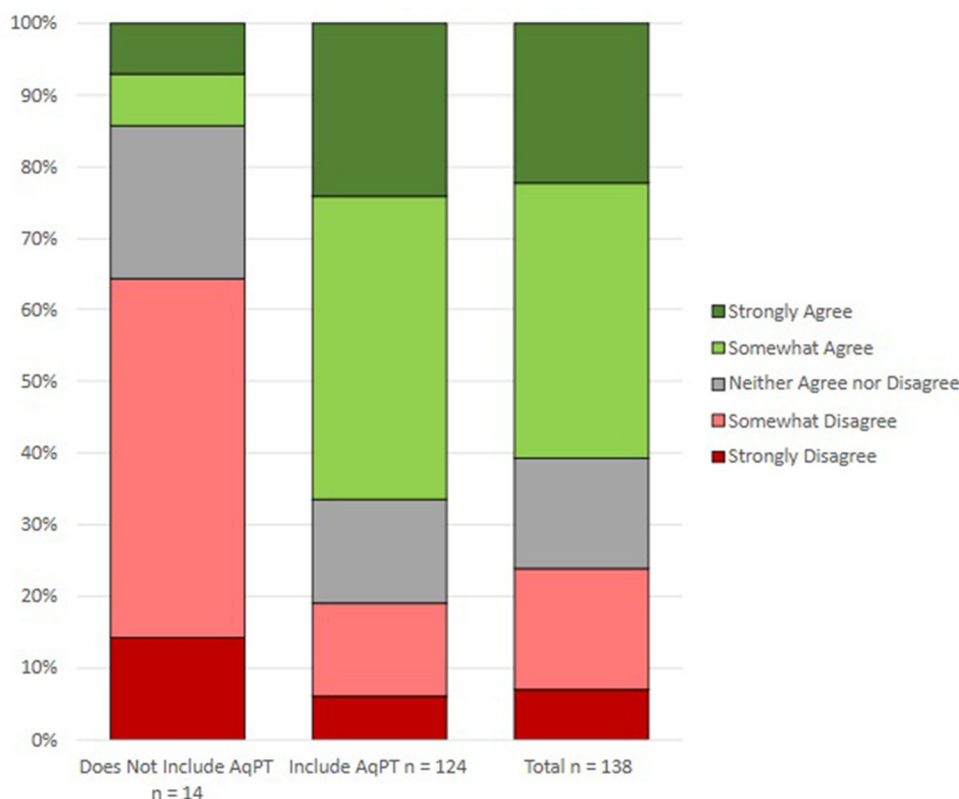


Fig. 2. AqPT education is needed for entry-level practice rating.

AqPT, a changing landscape in national PT and PTA curricula, and post-COVID-19 budgetary issues could all play into why programs may be decreasing AqPT curricula.

In their article, Morris and Jackson discussed what entry-level professional education is. They quoted the American Physical Therapy Association stating the goal of entry level professional education is “to develop in the learner a complex set of attitudes, values, and skills that ensure effective practice and maintain the values and standards of the profession.”¹ They also discuss the accreditation standards for PT and PTA programs and the lack of specificity in defining AqPT topics. Which lead to their conclusion of not considering AqPT as an essential entry level topic.¹ This study found that most persons in charge of teaching or organizing AqPT curriculum disagree, with that statement. Although there are a greater number of educators that include AqPT in their curriculum than believe it is required for entry-level PT and PTA practice, teaching AqPT may deepen critical thinking or clinical reasoning through repetition and application principles,¹⁵⁻¹⁷ as well as broaden students’ knowledge of interventions. Future studies may ask the opinion of a broader audience such as clinicians or all PT and PTA educators to limit bias towards AqPT being required for entry level practice of our sample.

One limitation of this study is that not all survey questions were designed identical to previous research¹ which does not allow for direct comparisons of each item. This design decision was intentional, aimed at minimizing survey length while accommodating the study’s secondary aims. Another limitation is the sample size. Both group had relatively small sample sizes,

increasing the study to sample bias and error.¹⁸ Generally, it is recommended to have a great than 50%, response rate with > 40% being considered acceptable.¹⁹ However, electronic sampling methodology traditionally receives a lower response rate¹⁸⁻²⁰ and survey fatigue during the COVID-19 pandemic further compounded this issue.²¹⁻²⁴ Despite these challenges, many researchers emphasize that response rate is not the sole factor when considering survey research strength; the sample quality and if the methodology rigor are equally critical.^{25,26} To improve sample quality and mitigate sampling bias with low response rate requires a demographic representation similar to the overall population that is being measured.¹⁹ This study achieved a representation similar to the demographic data of PT and PTA institutions across the US, and utilized rigorous study methodology. Nonresponse error is the final threat to this study.¹⁹ Although the study’s methodology addressed this issue, the lower response rate remains a weakness of the study.

Overall, AqPT appears to be a commonly included topic within many PT and PTA curricula. However, based on the current content being taught, it is unlikely that students will fully meet Brody’s 175 AqPT competencies upon graduation.²⁷ Some competencies pertain to advanced practice, while others, such as pool chemical maintenance, extend beyond the scope of what a typical student would learn during a clinical rotation in AqPT.²⁷ Current trends indicate relative stability in the inclusion of AqPT within curricula. However, if AqPT is no longer considered entry-level or if new curricular requirements emerge, the emphasis on AqPT in entry-level programs may decline. To address likely gaps the development of additional

resources that are tailored to support AqPT competency for practitioners new to AqPT is strongly recommended.

CONCLUSION

Currently, the majority of PT and PTA programs in the US teach AqPT and have returned to normal teaching methods post COVID-19. Educators of AqPT have moderately affirmed the importance of teaching AqPT in entry-level PT and PTA education. Trends in AqPT curriculum are stable. However, the content in entry-level PT and PTA education is limited and faces sustainability challenges related to contact hours and access to a pool. Both of which will limit new PT and PTA professionals from reaching entry-level AqPT proficiency at graduation from their accredited programs. This demonstrates a need for employers and the Academy of Aquatic Physical Therapy to create and maintain resources to bring new PT and PTA professionals to a competent level regarding AqPT practice.

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Appendix

I. Survey: questions within questions denote branching logic. More complicated branching logic is denoted in “[]”

- (1) What type of program is offered at your institution?
 - a. PT
 - i. How many semesters is your PT program?
 1. Less than 8, 8, 9, more than 9
 - b. PTA
 - c. Both

- (2) Is aquatic physical therapy education currently provided in your curriculum?
- No,
 - Yes
 - Is your aquatic physical therapy education provided in one class or threaded within the curriculum?
 - One class
 - Multiple classes
 - Threaded
 - Other
 - What methods are utilized in aquatic physical therapy education at your institution (select all that apply)?
 - Lab activities without a pool:
 - How many contact hours are dedicated to non-pool lab activities (synchronous or asynchronous) for aquatic physical therapy education at your institution?
 - Less than 1
 - 1 to 3.75 hours
 - 4 to 6.75 hours
 - 7 to 9.75 hours
 - 10 hours or more
 - Lab activities in a pool:
 - What type of pool do you use (select all that apply)?
 - Community pool
 - Facility of a clinical partner
 - Pool at your institution
 - Therapy specific pool
 - Stand-alone aquatic treadmill
 - Other
 - How many contact hours are dedicated to in-pool lab activities for aquatic physical therapy education at your institution?
 - Less than 1
 - 1 to 3.75 hours
 - 4 to 6.75 hours
 - 7 to 9.75 hours
 - 10 hours or more
 - Lecture
 - How many contact hours are dedicated to lecture (synchronous or asynchronous) aquatic physical therapy education at your institution?
 - Less than 1
 - 1 to 3.75 hours
 - 4 to 6.75 hours
 - 7 to 9.75 hours
 - 10 hours or more
 - Simulations
 - How many contact hours are dedicated to simulations in aquatic physical therapy education at your institution?
 - Less than 1
 - 1 to 3.75 hours
- 4 to 6.75 hours
- 7 to 9.75 hours
- 10 hours or more
- Skills check-offs or in-water competencies
 - How many contact hours are dedicated to skills check-offs in aquatic physical therapy education at your institution?
 - Less than 1
 - 1 to 3.75 hours
 - 4 to 6.75 hours
 - 7 to 9.75 hours
 - 10 hours or more
 - Videos
 - How many contact hours are dedicated to videos on aquatic physical therapy education at your institution?
 - Less than 1
 - 1 to 3.75 hours
 - 4 to 6.75 hours
 - 7 to 9.75 hours
 - 10 hours or more
 - Other
 - How many contact hours are dedicated to other aquatic physical therapy content at your institution?
 - Less than 1
 - 1 to 3.75 hours
 - 4 to 6.75 hours
 - 7 to 9.75 hours
 - 10 hours or more
- What content is included in your aquatic physical therapy curriculum
 - Adaptive swimming, Billing, Collaboration with other disciplines, contraindications for aquatic PT, Indications for aquatic PT, physical properties of water (ie, buoyancy, hydrostatic pressure, etc), physiology of immersion on body systems, pool operation and management (ie, chemicals, cleaning, liability), sports specific rehabilitation for aquatic athletes, therapeutic exercise in the aquatic environment, water rescue and patient safety, other.
 - Who provides the aquatic physical therapy education at your institution (select all that apply)?
 - Core faculty, adjunct or associated faculty, guest lecture
 - Currently, are there barriers to providing aquatic physical therapy education in your curriculum?
 - Unsure
 - No
 - Yes
 - What barriers to providing aquatic physical therapy education are present at your institution? (select all that apply)

- i. Access to experts in aquatic PT, pool access (financial), pool access (location), time within the curriculum, other.
- (3) Did the COVID-19 pandemic impact the aquatic physical therapy education provided at your institution?
 - a. Yes
 - i. Please briefly explain how COVID-19 changed how aquatic physical therapy education was provided at your institution.
 - b. No
 - c. N/A
- (4) In the future do you plan to change the number of contact hours devoted to aquatic physical therapy education at your institution?
 - a. No
 - b. Yes increase
 - c. Yes decrease
 - i. [Branch with a yes increase or yes decrease response] In the future do you plan to change the content taught within aquatic physical therapy education?
 1. No, yes (what changes will you make?):
- ii. [Branch with yes decrease only and currently use the pool for lab activities] Do you plan to continue using the pool for lab activities related to aquatic physical therapy in the future?
 1. No, yes, unsure
 - iii. [Branch with yes increase only and currently do not use the pool for lab activities; OR if AqPT is not currently provided in their curriculum and plan to change the number of contact hours devoted to aquatic physical therapy] Do you plan to seek the use of a pool for lab content in the future?
 1. No, yes
- (5) Aquatic physical therapy education is needed for entry-level practice
 - a. Strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree.
- (6) What is the primary content delivery methodology of your program?
 - a. Traditional, hybrid/virtual, other.
- (7) Is your institution public or private?
 - a. Private, public
- (8) Where is your institution located?
 - a. Rural, suburban, urban