PROMOTES POSITIVE KNOWLEDGE, SKILLS, ATTITUDINAL, FITNESS, AND DESIRABLE BEHAVIORAL CHANGES IN PRE-SERVICE PHYSICAL EDUCATION TEACHERS

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Abstract: Alternative assessment is a nontraditional, holistic way to assess students. It is beneficial, in physical education training, for the instructor to apply a variety of appropriate assessment tools. The purpose of this research was to study pre-service physical education teachers' perception of skills, attitude, knowledge, fitness, and other desirable characteristics by using swimming logs (SL) as assessment tools. Participants were 19 males and 11 females (mean age =18.07), all of whom were pre-service physical education teachers at Kasetsart University. Participants recorded their swimming distances outside of class for 6 weeks, with a goal of 1,500 meters. After 6 weeks they provided learning, behavioral and attitudinal self-perceptions via a reflection form. Quantitative data were analyzed by descriptive statistics, while qualitative data were analyzed via content analysis. The qualitative findings identified five pertinent domains of physical education instruction. The results suggest the potential of SL as an alternative assessment that can positively enhance learners' self-concept, motivation, and skill development.

Keywords: Alternative Assessment, Pre-Service Physical Education Teacher, Swimming Logs.

Introduction

Assessment is a critical aspect of the teaching process, providing an opportunity to communicate expectations and degree of goal attainment to students (Lund & Veal, 2013). The primary goal of assessment should be seen as the enhancement of learning (formative evaluation) rather than simply the documentation of learning (summative

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evaluation; National Association for Sport and Physical Education [NASPE], 1995). For many years, physical education teachers have relied on three types of assessments as the mainstays for evaluating student learning in physical education: skills tests, written tests and fitness tests (Lund & Tannehill, 2010; Lopez-Pastor, 2013)

Teachers might require students to "self-evaluate" by keeping track of practice trials or time spent doing various activities (Lund & Kirk, 2010). One self-evaluation method is a student log, wherein students document practice or activity done outside of class. For example, if a student needs to increase flexibility during a gymnastics unit, the teacher can prescribe appropriate exercises for the student to perform (Lund & Kirk, 2010), with the student recording activities or practice trials completed. Logs also allow students to track their progress, and can thus serve as a source of motivation for students (Lund & Tannehill, 2010).

The curriculum of many college/university departments of physical education includes swimming. Typical learning goals for swimming students are the ability to swim in various strokes, acquiring an appreciation for swimming, using swimming to improve health, and join in recreation time. Most physical education students have had some experience with swimming prior to their university swimming course. But while they can swim, many cannot swim multiple 50-meter laps (some cannot swim 50 meters) and/or do not use standard strokes (crawl, back, breast, butterfly) correctly. Due to lack of fitness and/or technique, many students find (especially beginners) find that swimming in a 50-meter pool requires more physical and mental fitness than they have at the outset of the course. In addition, some physical education students have a negative or fearful attitude toward swimming due to near-drowning experiences when they were young.

Swimming skills tests indicate a student's skill level but may not reflect the student's attitude towards swimming. Alternative assessment is a complementary and more holistic assessment method (Alternative Assessment, n.d.; Job, n.d.) (Sadeghi, 2015). Self-assessment is one alternative assessment technique that ensures students are the center of the learning process. A log can be a self-assessment tool that allows students to practice and demonstrate autonomy, independence and self-monitoring ability (Melogrono, 2000; Maclellan, 2004). Many different physical activity self-report instruments that can be used as physical education assessment tools are available, both in print (e.g., Giles-Brown, 2006) and via various websites. The most commonly used is a walking log that has been developed into a mobile application. The assessment of swimming can be similarly accomplished.

Swimming log activity (SLA) is a swimming formative evaluation that uses a log to record practice and other information. Practicing outside of class should enhance students' swimming skills, build good attitudes towards swimming, and make students feel better about themselves (Georgakis, 2015; Mintah, 2003). A swimming log is an excellent way to document and demonstrate not just progress but the learning process itself. Both students and their physical education instructors can monitor improvement via recorded changes in behavior and attitudes over time. Thus, by using SLA, students both demonstrate their participation in swimming activities, such as distance swum per session, and can increase their motivation as they see evidence of improvement over time. This suggests physical educators should require students to keep track of practice trials. In their swimming logs, students can set, in

addition to the instructor-provided goal, personal goals for improvement, and they can reflect more subjectively upon their progress toward all goals and their feelings about their activities and progress. Throughout the swimming unit students revisit all goals and reflect upon their performance in relation to their personal goals.

Objective

With this logical foundation, this research examined whether alternative assessment – specifically SLA -- in a swimming course promotes positive knowledge, behavioral, attitudinal and other desirable changes in pre-service physical education teachers.

Methodology

Participants

The convenience sample was comprised of pre-service physical education teachers who were enrolled in a swimming course at a Bangkok, Thailand university. Exclusion criteria were competitive swimmers and water polo players, and students who missed over 20 percent of class meetings. This yielded 30 participants: 19 males and 11 females with a mean age of 18.07 years.

Research instruments

In this study, there were two instruments were used to collect data: swimming logs (shown in figure 1) and reflection forms. Both instruments were developed and checked for validity by experts in Physical Education. These tools were used with 15 non- Physical Education major college students who enrolled in the swimming for health class.

No.	Date	Goal distance	Real distance	Feeling	Total distance	Signature
1	*12/07/2013*	*Fr 25 x 4*	*Fr 25 x 3*	*So tired, but I'm going to do*	*100 m.*	
		Ba 25 x 1	*Ba 25 x 1*	*better next time. For backstroke*		
				was not quite good, when I move		
				my arms back to the origin (in		
				the air) arms should stretch every		
				time.		

Figure1: Swimming Log Sample

Data Collection

Data collection occurred over the course of one semester. Pre-service physical education teachers were trained to use the swimming logs to record the distance each time they swam outside of class over a six-week period. The minimum total distance

goal was set at 1,500 meters. The pre-service physical education teachers were also able to set additional personal swimming distance goals, and would fill in their swimming logs as they worked toward accomplishing their goals. They were to record actual distances swum even if the final result was more or less than the initial goal. The pre-service teachers were also to reflect on their feelings every time they swam. At the end of the six- week period, the swimming logs were collected by the researchers, and the pre-service teachers further reflected on their perceptions using open-ended questions on a reflection form. The pre-service teachers were also rated on their learned swimming skills, using a 60-point scale with a 15-point maximum for each of the four strokes.

Data Analysis

Descriptive statistics were used to summarize the pre-service physical education teachers' characteristics and their swimming log information. Content analysis was used to analyze self-perceptions noted in the reflection forms. Responses were coded into five areas: skills, attitude, knowledge, fitness and desirable characteristics.

Results

Thirty of the 39 pre-service physical education teachers met all inclusion criteria for data analysis. (Four pre-service teachers could not provide complete data, three pre-service teachers dropped the class, and two pre-service teachers were varsity water polo athletes at the university.)

Characteristics of the Sample

The pre-service physical education teachers had a mean age of 18.07 year (*S.D.* = 0.69). Nineteen were male (63.33%), 11 were female (36.67%), and three (10%) had had a near-drowning experience. Sixteen (53.33%) met the pre-determined goal of 1,500 meters or more, while 14 (46.67%) did not meet the goal. The average number of swimming practices outside of class was 7.40 times (*S.D.* = 3.62) over 6 weeks. The average swimming distance goal was 1,737.97 meters (*S.D.* = 1092.23) and average accumulated swimming distance was 1,564.17 meters (*S.D.* = 850.80). The average swimming skills score was 29.47 points (*S.D.* = 8.73) (Table 1).

Table 1: Sample Characteristics and Swimming Log Information

Characteristics and Swimming Logs Information	Overall (n=30)
Age, mean (*S.D.*)	18.07 (0.69)
Gender, n (%)	
Male	19 (63.33)
Female	11 (36.67)
Prior near-drowning experience, n (%)	3 (10)
Met the 1,500 meters goal, n (%)	
Yes (1,500+ m.)	16 (53.33)
No (<1,500 m.)	14 (46.67)
Mean practice frequency outside class, n, (*S.D.*)	7.40 (3.62)
Swimming distance goal, mean (m.) (*S.D.*)	1,737.97 (1092.23)
Accumulated swimming distance, mean (m.) (*S.D.*)	1,564.17 (850.80)

Table 1: Sample Characteristics and Swimming Log Information

Characteristics and Swimming Logs Information	Overall (n=30)
Crawl	938.33 (494.83)
Backstroke	218.33 (219.61)
Breaststroke	354.17 (567.55)
Butterfly	53.33 (97.10)
Swimming skill score, mean (*S.D.*)	29.47 (8.73)
Crawl	8.73 (2.61)
Backstroke	7.87 (2.73)
Breaststroke	8.33 (2.73)
Butterfly	4.53 (4.67)

Intergroup Comparison. Compared to the participants who did not accumulate 1,500+ meters, the group that swam 1,500 meters or more over the six-week observation period swam more times outside class and accumulated about 2.5 times the swimming distance (Table 2).

Table 2: Intergroup Comparison

	Over 1,500 meters n=16	Below 1,500 meters n=14	Mean difference	t	sig
Frequency for practice, mean number of time (*S.D.*)	9.69 (3.36)	4.79 (1.53)	4.90	5.014	.000
Accumulated swimming distances, mean m (*S.D.*)	2,170.31 (711.47)	871.43 (248.43)	1,298.88	6.482	.000

Subjective Perceptions

Toward the end of the study, researchers asked all students to complete a reflection form comprised of open-ended questions that gathered participants' subjective and reflective answers. (For example, "What in SLA helped you? How did you feel about it? Has your attitude about this changed?"). Pre-service physical education teachers' responses were analyzed using content analysis, and focused on the key themes that reflect the five physical education learning achievement domains (Table 3).

Psychomotor domain: SLA promoted skills learning while studying swimming in class, helped prepare for skills examinations, and encouraged swimming for exercise in daily life. However, SLA could restrict skills learning when the participant swam alone or with a friend who did not swim well.

Affective domain: SLA seemed to help pre-service teachers overcome their perceived limits, fears, and feelings of exhaustion. Participation in goal setting promoted pre-service teachers' perceptions of responsibility and self-discipline. Furthermore, participants' comments implied this activity helped them understand the benefits of swimming and attach a positive value to swimming.

Cognitive domain: SLA seems to contribute to the learning process via "share and learn" between peers, promoting use of this pedagogy in organizing the process of teaching swimming. Make they understand the natural of swimming exercise. As

before, comments implied potential restriction of practice skills if participants practiced with a peer who has no or poorly developed swimming skills.

Fitness domain: SLA documented both improved fitness and more conscious awareness of fitness levels.

Desirable characteristics: SLA appears to have the potential to help develop positive characteristics such as learning to support one another, physical activity time management, formation of good physical activity attitudes and habits, and self-monitored academic integrity via responsibility for their own logs.

Effect of Near-Drowning Experience on Perceptions

Three participants (10% of the sample) noted a prior near-drowning experience and a persisting fear of water. By the end of their participation in the six-week SLA, however, they had accumulated a greater swimming distance than their initial goal. They also seem to have overcome their fear of water and developed a positive attitude towards swimming. For example, one participant wrote, "I got to practice and tried to improve my swimming stroke and my awareness of the importance of swimming. I had a chance to improve my cardio-respiratory fitness and increase my physical fitness. I was able to show my professor my will to succeed. The more practice I had, the faster I swam. I enjoy swimming very much and it has had a positive effect on my studies in other subjects. Practice swimming is like meditating because I have to concentrate on body movement and breathing; if I make a mistake it will disrupt my coordination. I also had a chance to improve my self-discipline and to know my limits and try to push myself past my limits to a higher level" (Chitpol T., personal communication, May 10, 2013).

Table 3: Participants' Perceptions of Skills, Attitude, Knowledge, Fitness and Desirable Characteristics

Perceptions of skills, attitude, knowledge, fitness and desirable characteristics (n=30)			
	Ideas	n (%)	Themes
Psychomotor	• Swimming practicing aids retention of learned physical skills. It reinforces what was learned in class and must be performed in swimming skills test.	18 (60)	• SLA encourages practicing and reviewing the lesson, leading to improved swimming skills.
	• It helps us improve our swimming skills.	13 (43.33)*	• Using SLA may be limit opportunity to correct their skill at that time.
	• It identifies weaknesses teaches us to observe ourselves so we can correct weak points.	8 (26.67)	
	• We learn better control of breathing skills.	6 (20)	
	• We can better monitor our swimming effort as it relates to goal setting.	2 (6.67)	

Table 3: Participants' Perceptions of Skills, Attitude, Knowledge, Fitness and Desirable Characteristics

Perceptions of skills, attitude, knowledge, fitness and desirable characteristics (n=30)			
	Ideas	n (%)	Themes
	• Sometimes I swam incorrectly but I did not how to fix it immediately.	1 (3.33)	
Affective	• I can do more than I thought I could, overcome physical and mental exhaustion, learn to do what's difficult, and know and fight to overcome my limit.	13 (43.33)*	• Using SLA can help overcome limits and (the fear of) exhaustion. • SLA formalizes setting goals and targets, and promotes responsibility and self-discipline. • SLA makes it easier to acquire and understand positive swimming values and benefits.
	• I have more diligence and patience in practice swimming regularly.	6 (20)	
	• I can take responsibility for assignments and tasks.	6 (20)*	
	• I am more acclimatized to the water and swimming, and feel good about swimming. I'm encouraged to try other swimming strokes that I'm not comfortable with.	5 (16.67)	
	• I have more discipline.	4 (13.33)*	
	• I feel good about swimming.	3 (10)*	
	• Encouraged me to recognize my own goals and take action to achieve those goals. SLA makes me proud of myself.	3 (10)	
	• Swimming makes a beautiful shape.	2 (6.67)	
	• Knowing the value of swimming makes it easier to do in daily life.	2 (6.67)*	
	• Overcome the fear of water.	2 (6.67)*	
	• At first, I could not swim well; I was discouraged and almost quit.	2 (6.67)	
	• Swimming releases stress and helps me sleep better.	1 (3.33)	
	• I fear I cannot swim.	1 (3.33)	
Cognitive	• SLA helps me remember swimming procedure and can be used to teach in the future.	5 (16.67)*	• SLA contributes to the learning process of learning through

Table 3: Participants' Perceptions of Skills, Attitude, Knowledge, Fitness and Desirable Characteristics

Perceptions of skills, attitude, knowledge, fitness and desirable characteristics (n=30)			
	Ideas	n (%)	Themes
	It can even be used to teach other people such as family or friends.		sharing, and can even be used with non-students.
	• Swimming is an exercise without impact. And it exercises all part of body.	3 (10)	• SLA contributes to learning and encourages swimming as a lifelong activity. • SLA let them know a natural of swimming exercise.
	• SLA is an opportunity to share learning between peers, and get suggestions from friends who are good at swimming.	2 (6.67)	
	• Peers cannot clearly explain how to swim.	1 (3.33)	• SLA may not help if with a friend who doesn't swim.
Fitness	• SLA encourages me to exercise and improve my health and fitness.	16 (53.33)*	• SLA can promote fitness. • SLA promotes knowing one's physical fitness level.
	• Better cardio-respiratory fitness.	10 (33.33)	
	• An opportunity to train for long distance swimming, and train for endurance.	8 (26.67)*	
	• I can continue swimming for long distances without fatiguing easily. Moreover, I feel better when I play other sports.	7 (23.33)	
	• Endurance training and knowing my fitness level.	1 (3.33)	
	• I don't feel exhausted and fatigued.	1 (3.33)	
	• If I swim incorrectly, I will become exhausted and fatigued, and waste my time.	1 (3.33)	
Desirable Characteristic	• Know to manage time to practice swimming after class.	3 (10)	• SLA can help develop desirable characteristics in learners.
	• Learn peer to peer support	3 (10)	
	• Not give up during hard tasks	2 (6.67)	
	• Know myself and understand my potential.	2 (6.67)	

Table 3: Participants' Perceptions of Skills, Attitude, Knowledge, Fitness and Desirable Characteristics

Perceptions of skills, attitude, knowledge, fitness and desirable characteristics (n=30)		
Ideas	n (%)	Themes
• Learning integrity by having responsibility for my written log	2 (6.67)	
• Learning to accumulate success little by little.	1 (3.33)	
• Proud of myself	1 (3.33)	
• Learn to make and implement plans	1 (3.33)	

Note. * = Reflections from those with prior near-drowning experience.

Discussion

Pre-service physical education teachers kept swimming logs and practiced swimming outside class for six weeks, achieving a mean cumulative swimming distance of 1,564.17 meters. Just over half of the thirty participants (53.33%) reported meeting or exceeding the pre-set goal of 1500 meters of accumulated swimming distance; the remainder (46.67%) did not achieve the goal that had been set by their instructor.

Pre-service physical education teachers received an average overall swimming skills score at 29.47 (out of a possible 60). Those who accumulated 1,500 meters or more averaged 32.00, higher than 26.57 average for the group that did not accumulate 1,500 meters. The higher-achieving group averaged 9.69 practices outside class, compared to 4.79 practices for the other group. Overall, the accumulated swimming distances averaged 2,170 meters for the higher-performing group, while the other group averaged only 871 meters.

Just over half the pre-service physical education teachers accumulated a greater swimming distance than the pre-set goal, and they averaged a moderate swimming skill score. This supports prior research on the effect of goal-setting on college football players, which showed successful rates of goal attainment and improved performance (Ward & Carnes, 2002). SLA promotes self-monitoring and seems to have encouraged pre-service physical education teachers to increase swimming distances. Similarly, Schonwetter, Mitenberger and Oliver (2014) reported that using self-monitoring in swimmers can increase their work output.

It is possible that the underachievement of the lower-performing group (47% failed to meet the pre-set goal) may be because students had only six weeks to learn and implement SLA as a tool to help raise the odds of their completing their swimming distance. A longer time period – a semester is certainly logical at colleges and universities – would likely raise the success rate, even with a proportionately increased swimming distance goal.

Moreover, different students have different capacities for learning swimming skills. In fact, some students were found to not have sufficient skills to practice by themselves after class. This lead, for instance, to qualitative data where some students stated, "I cannot adjust my stroke immediately when I went to swimming alone

without a friend who has good skills." However, this is counter-balanced by the advantage pre-service physical education teachers found, e.g., "the SLA made me exchange learning with friends." For better or worse, peers influence the learning process.

Implementation of Swimming Log Activity (SLA)

Pre-service physical education teachers who participated in the SLA had opportunities to practice and learn to improve their swimming ability. By using a swimming log to track swimming distance and record their reactions and feelings, students learned to set a goal before practice and precisely record the actual distance swum. This allowed students to track their own progress. In fact, it forced them to be responsible for it. They gained experience day to day and, consequently, gradually built confidence in their swimming ability. Of course, another meaningful benefit of SLA is that instructors are able to track the students' progress as well.

When physical educators give students the opportunity to practice a skill, they should also allow and teach students to review, repeat, and individually adjust their skills, but also emphasize skill-related knowledge and positive attitudes toward this (and all) physical activity. Becoming more capable at swimming encourages more frequent and more pleasant participation and practice. Consequently, pre-service teachers develop a good attitude toward swimming -- apparently even those pre-service teachers who have had a prior near-drowning experience.

By using the SLA, pre-service physical education teachers can not merely perceive but actually see concrete achievement. This helps improve pre-service teachers' learning about and attitude towards swimming and makes them feel good about themselves. Giving the pre-service teachers the task of setting their own goals, in addition to the goal pre-set by the instructor, gives them a stake in achieving these goals. They also learned to not set their own goals so high that they are unachievable, yet not so low that a reasonable and engaging challenge is not provided. They were encouraged to take risks and to motivate themselves to try to achieve their own goals. Their accomplishments are consistent with research showing that incremental goal-setting with a high probability of success given substantial effort improves both performance and attitude toward the activity. Finally, there is evidence from their self-reflections to show that this SLA encouraged greater self-discipline and helped them develop their swimming skills, knowledge, and attitudes.

Conclusion

SLA, as a complementary assessment instrument, can have several beneficial outcomes. It can enhance physical swimming skills, encourage acquisition of knowledge of the lifelong value of swimming for fitness and health, promote a positive attitude toward swimming (even in those with prior negative experiences), and develop other desirable traits such as time management, program planning and implementation, and monitoring progress toward goal attainment. SLA can help people confront and exceed what they thought were their limits, building an awareness of their own potential. Finally, the swimming log (SL) is an additional, alternative assessment mechanism for physical education classes with the potential to positively enhance the self-concept, motivation, and achieved skills of students.

Research on the value of swimming logs in particular, and activity logs in general, should continue, especially to the extent that this and prior studies have found beneficial results. Different nations have different cultures that produce different educational systems with variations in values and practices regarding the nature and role of physical education as well as expectations regarding appropriate levels of student autonomy and self-direction. Research can assess the balance between cultural universals and cross-cultural variability in this area, information that will be useful in developing best practices. Future research should encourage not only outcomes measures but also baseline measures, and should use control groups whenever possible and ethical, e.g., a swimming class that has no history of SLA. Larger and probability-based samples will of course reduce the likelihood of sampling error, increase the ability to claim sample representativeness and generalizability of results, and raise the odds of statistically significant findings. Finally, samples from outside the university – primary or secondary school students, workforce, and older adults – would add diversity to the knowledge base.

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