

CONTRIBUTORS

Erik H. Hofmeister is Professor of Anesthesia in the Department of Clinical Sciences, College of Veterinary Medicine at Auburn University. Bryan A. McCullick, Philip Tomporowski, and Paul G. Schempp are Professors of Kinesiology in the Department of Kinesiology, College of Education at the University of Georgia.

RELATIONSHIP BETWEEN RANK AND INSTRUCTOR TEACHING TECHNIQUE IN AN ADULT MARTIAL ARTS SETTING

ERIK H. HOFMEISTER, BRYAN A. MCCULLICK,
PHILIP D. TOMPOROWSKI, AND PAUL G. SCHEMPP

DOI

10.18573/mas.102

KEYWORDS

Interaction, CAFIAS, ALT-PE, teaching, pedagogy, systematic observation

CITATION

Erik H. Hofmeister, Bryan A. McCullick, Philip D. Tomporowski, and Paul G. Schempp. 2020. 'Relationship Between Rank and Instructor Teaching Technique in an Adult Martial Arts Setting' *Martial Arts Studies* 9, 54-70. doi.org/10.18573/mas.102

ABSTRACT

There is a dearth of centralized organizations that focus on systematic methods of training, evaluating, and certifying martial arts instructors. Presently, martial arts instructors often learn to teach through the apprenticeship of observation. Learning through the apprenticeship of observation is known to facilitate poor pedagogical techniques by the instructor and propagates bad pedagogical techniques through 'generations' of instructor-to-student transmission. Since rank is correlated with duration of practice as a martial artist, it is often assumed that those of higher rank are more competent in both martial arts and teaching ability than those of lower rank. The purpose of this study was to relate martial arts instructors' behavior with their rank. Instructors who differ in black belt rank (1st to 5th degree) were video recorded teaching a martial arts class. Videos were analyzed using the Academic Learning Time-Physical Education (ALT-PE) system and Cheffers' [1990] Adaptation to Flanders' [1970] Interaction Analysis System. As predicted, there was a positive relation between rank and instructor behaviors expected to result in better student performance. Comparing formal and informal training methods for instructors would be valuable in the future.

INTRODUCTION

In the United States, the martial arts industry represents over \$4 billion US in trade a year and has grown more than 5% in the past 5 years [IBIS World 2018]. More than 72,000 people are employed in over 67,000 related businesses throughout the United States. In 2014, there were 3.7 million participants age six and over. This reflects a large number of people who act as students and as instructors in a martial arts setting.

The development of martial arts has led to hundreds of organizations representing dozens of different styles of martial arts. For example, from Yoshukai karate, itself an offshoot of Chito-Ryu karate, there are the following organizations: United States Yoshukai Karate Association, World Yoshukai Karate Kobudo Organization, Yoshukai International, Yoshukai Karate International, Yoshukan Karate Association, and several smaller organizations of less than a half dozen schools. As such, there is no central governing body for martial arts, even for individual styles such as karate or judo. Even sports which are recognized by the Olympics, such as judo, have numerous organizations. Judo has 6 different organizations in the United States. This decentralization of authority in martial arts has disadvantages when it comes to instructor training. There is not a systematized method for training new instructors, evaluating existing instructors, or quantifying student learning outcomes.

Numerous organizations have attempted to provide instructor training and certification. Large organizations, such as the United States Tae Kwon Do Alliance, as well as small organizations, such as the American Kyuki-Do Federation, provide instructor training to develop prospective and existing instructors within a specific style. Groups that offer instructor certification regardless of the martial arts organization to which the instructor belongs do exist, but none of them have external authority (such as by an accrediting agency) to do so. The majority of the certifications are also offered without validating the instructor's teaching skill or credentials- they merely require a payment to be sent to be certified. Without an external authority to check the certification process of any of these organizations, there is no quality control. This lack of quality control can lead to individuals being 'certified', but this is a meaningless designation.

Because of the lack of a centralized organization to teach and certify teachers, martial arts instructors may learn to teach through the apprenticeship of observation [Schempp 1989]. New instructors are usually identified as talented or energetic students as they progress through the ranks [Czarnecka 2001]. These students are given teaching responsibilities for lower ranked students, presumably acquiring experience in teaching in the process. As students progress in rank, they gain greater responsibility and authority, eventually being able

to run an entire class for the duration of a teaching period, usually 1-2 hours. Czarnecka [2001] argues that virtually no schools provide formal training during these instructional experiences. As such, most martial arts instructors have no formal understanding of pedagogy and often have pedagogical techniques which are limited in scope and effectiveness. Czarnecka [2001] emphasizes that learning through the apprenticeship of observation may lead to poor pedagogical techniques by the instructor, and propagation of bad pedagogical techniques through 'generations' of instructor-to-student transmission. Furthermore, those learning from the apprenticeship of observation are unlikely to be familiar with issues relating to child protection and welfare, diversity and inclusiveness, and health and safety.

CLASSROOM OBSERVATION SYSTEMS

Teacher behavior impacts student learning [Graber 2001]. Teachers can influence how students interact with and learn the content [Brophy 1986]. Studies conducted in physical education settings indicate that teachers spend more time in management and less time instructing than they believe [Graber 2001]. Behavioral observation systems attempt to quantify student behavior, teacher behavior, and student-teacher interactions. These data are helpful for determining what, exactly, is occurring in the practice space and how that may affect student learning. Non-systematic observation systems include the eyeball technique, checklists, and rating scales [van der Mars 1989: 5]. The eyeball technique entails having an observer watch an instructional activity and then provide subjective qualitative feedback to the instructor. These non-systematic methods are typically easy to do but are subject to significant bias in data collection and analysis [van der Mars 1989: 6]. For example, the eyeball technique is often influenced by the halo effect, whereby other behaviors of a teacher – such as them being positive and well-liked – affect how the observer interprets the teacher's behavior.

Systematic observation methods attempt to minimize bias but require more time and expertise to use [van der Mars 1989: 7]. Appropriate training is essential to ensure appropriate reliability and validity in the data obtained. Observation systems may be quantitative – where numerical data attempts to explain what is happening, such as how many minutes students spend waiting – or qualitative – where text data attempts to explain why events are happening, such as why the instructor manages the class so that the student waits. Within quantitative systems, Cheffer's Adaptation of Flander's Interaction Analysis System (CAFIAS) attempts to describe interaction patterns between the teacher and students [Cheffers 1990]. The Academic Learning Time-Physical Education (ALT-PE) system attempts to

quantify the amount of time students spend engaged in various activities during a class [Metzler 1989: 225].

The CAFIAS is a system where an observer records what the teacher and student behaviors are in an ongoing fashion [Cheffers 1990]. The observer records behavior whenever it changes or every six seconds, whichever comes first. Therefore, if a teacher is lecturing for 12 seconds, it is recorded as two instances of lecturing. If the teacher lectures for five seconds and then a student interrupts with a question, it is recorded as one instance of lecturing and one instance of student-initiated question. The CAFIAS includes categories for verbal and non-verbal behaviors by either the teacher or the students. Data analysis includes reporting of simple percentages – how many behaviors of a certain type occur in a lesson – as well as interaction analysis – what the most common patterns of teacher-student interactions are. There are 20 interaction patterns and up to ten interaction patterns are typically analyzed. The CAFIAS has a bias towards teacher behavior, and quantifies interactions, but is not as good about describing what, exactly, students are doing, as van der Mars argues [1989: 119].

The ALT-PE system is based on the theory that academic learning time – how much time students spend learning a concept – predicts student knowledge acquisition [Berliner 1975]. The observer selects three students and then records what one student is doing during a six second span, then records the next student, then the third, and rotates back to the first [Metzler 1989: 225]. Each student behavior is quantified according to a series of levels, ultimately culminating in the student engaged in a motor-appropriate task, which as a percentage of time is the ALT-PE. The ALT-PE system quantifies how much time students spend doing various tasks and behaviors but does not describe the interaction between the teacher and the students. The relationship between ALT-PE and martial arts skill acquisition has been demonstrated [Ko 1986]. In that study, students were recorded performing three martial arts skills, and their performance on these skills was scored by blinded observers. The performance level was then related to ALT-PE of the students during class. A significant relationship was found, confirming that the ALT-PE is an appropriate tool to measure student skill acquisition in martial arts. The ALT-PE system used in this study has 14 domains for behaviors, including motor-engaged, which is the value used to determine the actual ALT-PE [Metzler 1989: 225].

Systematic observation methods have been used and described in a martial arts setting. Weise [1995] videotaped two instructors, each teaching one of three one-hour lessons: to adult mixed-rank students, youth beginning students, and youth mixed-rank students. Two 20-minute samples (from adult mixed-rank and youth beginning classes) were analyzed. A 10-minute sample from the youth mixed-rank

class was used as training. A modification of the Classroom Observation Record (COR), which is a checklist of behaviors engaged in by the teacher, was used. The COR is completed for an individual instructional theme – usually there are five to seven in each class period. The results of the observations were not reported, since the purpose of the study was to establish reliability and construct validity for the modified COR.

Vertonghen, Theebom, and Cloes [2012] studied five teachers of aikido, five of kickboxing, and 10 of karate using a questionnaire called the Teaching Approach to Martial Arts (TAMA). Each instructor had an interview before a class period, were observed and videotaped during a class period, and had an interview and TAMA given after the class period. The TAMA consisted of seven questions with five levels ranging from traditional to efficient (or sport). The TAMA results were explained in the context of the interviews and observation, which confirmed that the TAMA was measuring what it intended to measure. The purpose of the TAMA was to identify classes and styles as traditional, education, or efficient/sport.

An unvalidated modification of the COR was used in one study, and the other study was attempting to establish the validity of a new observation system. Neither used a previously validated system to observe the interaction between the teacher and the students. The interaction between teacher and students has not been documented in the context of teaching martial arts. In the study by Vertonghen, Theebom and Cloes [2012], although interviews were conducted, their purpose was to establish the style of instruction, rather than document how the teacher and students felt about the interaction in the class. Finally, the focus on most research of pedagogy in martial arts has focused on teaching young students. The interaction patterns between teachers and adult students is understudied.

OBJECTIVE

No study that we are aware of has applied systematic observation to compare the experience of the instructor, as determined by their martial arts rank, on instructional behaviors. Since rank is correlated with duration of practice as a martial artist, it is often assumed that those of higher rank are more competent in both martial arts and teaching ability than those of lower rank. In this study, all instructors held first degree black belt rank or higher. The purpose of this study was to relate martial arts instructor's behavior with their rank in a non-random, convenience sample of two martial arts schools in an urban area in the southeastern United States. Given that the CAFIAS and ALT-PE system prove useful in this context, collecting more expansive data may allow for generalizations to be made about martial arts instructor behavior.

MATERIALS AND METHODS

The setting for this study is two martial arts schools located in an urban area in the southeastern United States. One is a non-commercial martial arts school owned as a side hobby by the owner and not a source of income for the owner. The other is a professional commercial martial arts school which is the primary source of income for the owner.

The study was approved by the University of Georgia Institutional Review Board (IRB) and informed consent was obtained for all participants prior to study start. Participants were the teachers of the classes. The head instructors of each school were asked to identify all of the active adult (18 years of age or older) black belts in their school and provided an email address for each black belt. Every active adult black belt in each school was then sent a recruitment email soliciting participation. There were no exclusion criteria. Those individuals who volunteered replied to the email and were provided with an informed consent form to sign.

Once informed consent was obtained, a time for the participant to teach their class was chosen by the participant. Regular students of

each school attended the recorded class as usual. The IRB did not require consent from the students, since they were not the focus of the investigation. No attempt was made to prevent participants from being students in the classes of other participants. However, every participant regularly acts as students in the other participants' regularly offered class. Classes were recorded over the span of two months, with no attempt made to control for number of students, time of day or day of the week of the class, or marketing of the class to students. The goal was to make the class be as routine as possible in every way except the instructions to the instructor on the content to teach during that class period.

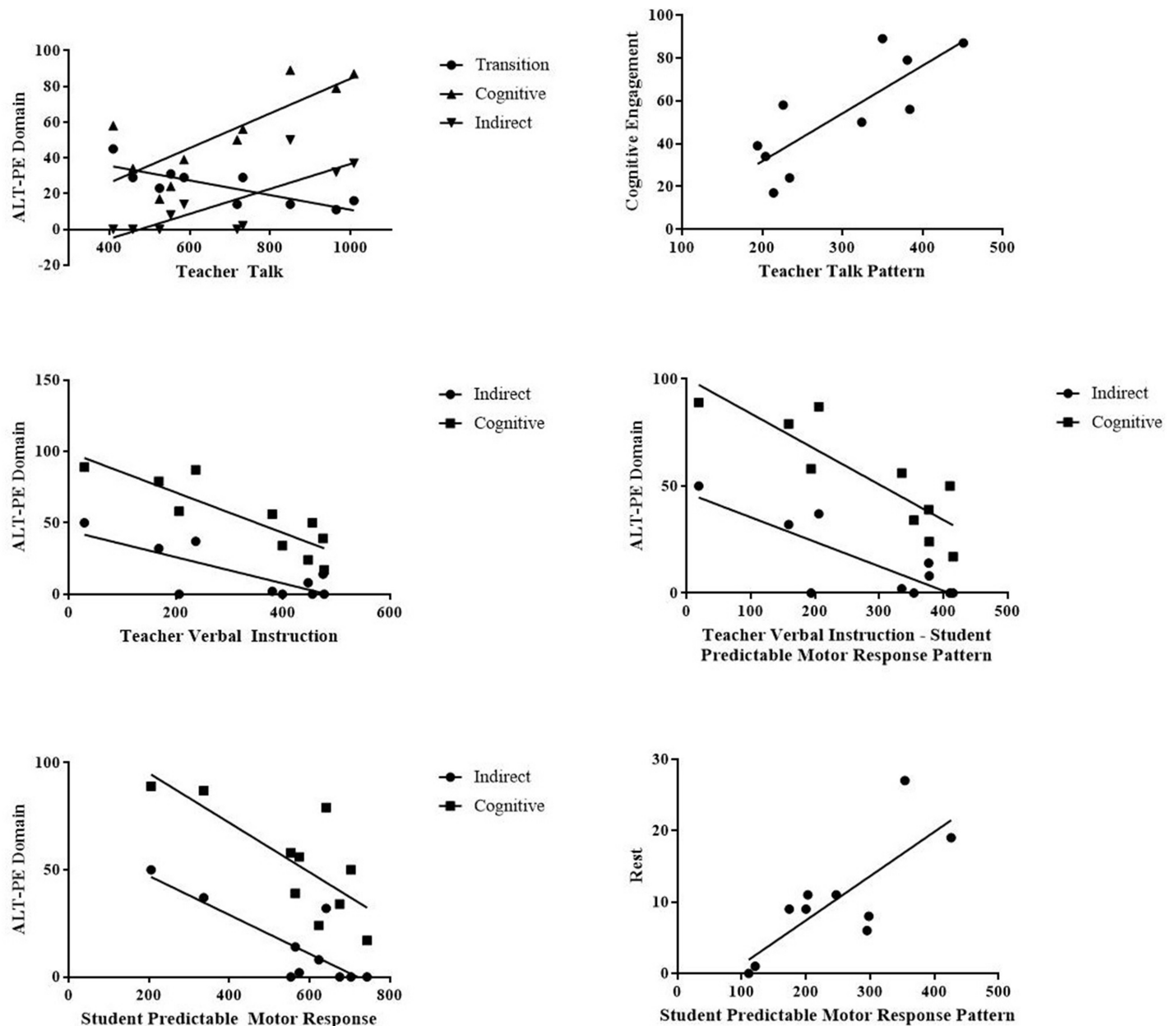
Participants were considered 'Low' rank if they were ranked as a first-degree black belt, as 'Middle' rank if they were considered by the head instructors of both schools to be a proficient, but not expert, instructor, and as 'High' rank if they were considered by the head instructors of both schools to be an expert instructor (Table 1 below).

All participants had engaged in a certified instructor training (CIT) course held by both schools which were involved in this study. The CIT was either a weekend intensive or a weekly session, each

Participant ID	School	Rank Level	Style of Martial Art Taught in Recorded Lesson	Partner (P) or Non-Partner (N) Class	Gender	Age	Number of Years Martial Arts Experience	Number of Years Teaching Martial Arts	Highest Black belt Degree
A	AMA	Low	Kyuki-Do	N	Male	55	22	4	First
B	AYK	Low	Karate	N	Male	31	25	3	First
C	AYK	Low	Karate	N	Female	34	4.5	3	First
D	AYK	Low	Karate	N	Female	24	3	2	First
E	AMA	Middle	Hapkido	P	Male	38	20	10	Second
F	AMA	Middle	Kyuki-Do	N	Male	32	10.5	5	Third
G	AMA	Middle	Karate	N	Male	37	10	5	Third
H	AMA	High	Aikido	P	Male	40	16	12	Third
I	AMA	High	Kyuki-Do	P	Male	42	26	23	Fifth
J	AYK	High	Karate	N	Male	39	24	22	Fourth

Table 1:
Characteristics of participants

Figure 1:
Relationship between CAFIAS categories (x axis) and
ALT-PE domains (y-axis). Values for CAFIAS are
number of counts of that behaviour. Values for ALT-PE
are number of 6 second segments with that activity. All
relationships are significant ($p < 0.01$).



composed of at least eight hours of instruction in how to teach. Topics were characteristics of a great instructor, developing student rapport, basic class structure and warmup, teaching techniques, integrating a new student, and martial arts troubleshooting. Each session included a short practicum where the participants taught the rest of the group and received feedback on their performance. The CIT program had been offered every six months for four years prior to the start of the study. The CIT program was held outside of regular class hours, and students at either school could elect to participate for a fee. The last CIT cycle was held approximately two months prior to the start of this study.

A video and audio recording of each training segment was made. A camera was placed on a tripod facing at a 45-degree angle to the orientation of the students, directed towards the students but including the instructor in the frame. Recording began immediately before students bowed to begin the class and ended once the students bowed to the teacher at the end of the class. The recordings captured the entire one-hour class period. The audio recording was from the same camera, with no additional microphones.

Each video was scored at separate times using the CAFIAS and ALT-PE system. Each video was reviewed continuously for the entire duration of the class. Class duration was defined as the time between the end of the bow at the start of class and the start of the bow at the end of class. Intra-rater reliability was established by the observer rescored the first three videos viewed at least three months later. The first three videos represent one instructor each from the Low, Middle, and High groups.

Intra-rater reliability was calculated using Pearson's correlation. The correlation for the CAFIAS was significant for all three videos ($P < 0.0001$) and the correlation was high ($r^2 = 0.98, 0.99, \text{ and } 0.99$). The correlation for the ALT-PE system was significant for all three videos ($P < 0.0001$) and the correlation was high ($r^2 = 0.92, 0.96, 0.96$).

Normality was determined using the D'Agostino-Pearson method. Relationships between CAFIAS categories and ALT-PE domains were evaluated using linear regression to analyze how the CAFIAS categories and ALT-PE domains relate with each other and to provide further evidence for validity in the form of relations to other variables. Significance was set at $\alpha = 0.01$. CAFIAS categories and ALT-PE domains were compared among three levels of instructor rank (Low, Middle, and High) by visual examination of the data. CAFIAS categories and ALT-PE domains were compared between those instructors teaching primarily partner-based classes and those teaching classes without partner work by visual examination of the data. Statistical comparisons were not made due to the low sample size.

RESULTS

Statistically significant linear regression relationships are provided in Table 2 and Figure 1. Five CAFIAS categories and three response patterns had significant relationships with ALT-PE domains.

CAFIAS Differences Between Instructor Ranks

High ranked instructors had nearly twice the amount of nonverbal praise of Low and Mid ranked instructors (Table 3). High ranked instructors provided more instruction and gave less directions than Low and Mid ranked instructors. High ranked instructors had more interactions where students provided higher order verbal and nonverbal responses than Low and Mid ranked instructors. Low ranked instructors had more confusion than Mid and High ranked instructors. High ranked instructors had less silence than Low and Mid ranked instructors.

ALT-PE System Differences Between Instructor Ranks

High ranked instructors had dramatically less wait time than Low and Mid ranked instructors (Table 4). They also had 50% more time dedicated to Cognitive learning. Low ranked instructors had dramatically less Practice-Indirect time than High and Mid ranked instructors. Mid ranked instructors had less ALT-PE than Low and High ranked instructors.

CAFIAS Differences Between Partner and Non-Partner Classes

Instructors of non-partner classes gave notably more verbal praise than instructors of partner classes (Table 5). They also had more verbal acceptance, gave more directions, had students who gave predictable verbal and nonverbal responses and analytical nonverbal responses. Instructors of partner classes gave more verbal and nonverbal instruction.

ALT-PE System Differences Between Partner and Non-Partner Classes

Instructors of non-partner classes spent more time in transition, management, and rest than instructors of partner classes (Table 6). They also had a higher ALT-PE. Instructors of partner classes had more Cognitive learning time and dramatically more Indirect skill practice time than instructors of non-partner classes.

CAFIAS Category	ALT-PE Domain	r	P-value
Teacher Verbal (5)	Transition (-)	0.81	0.004
	Motor Indirect (+)	0.79	0.007
	Engaged Cognitive (+)	0.79	0.006
Teacher Verbal Direction (6)	Motor Indirect (-)	0.77	0.009
	Engaged Cognitive (-)	0.87	0.001
Teacher Nonverbal Instruction (15)	Transition (-)	0.85	0.002
	Motor Indirect (-)	0.88	0.001
Predictable Student Nonverbal Response (18)	Motor Indirect (-)	0.82	0.004
Teacher Verbal Pattern (5-5)	Engaged Cognitive (+)	0.81	0.005
Teacher Direct Command Student	Motor Indirect (-)	0.82	0.004
Predictable Nonverbal Response Pattern (6-18)	Engaged Cognitive (-)	0.86	0.001
Student Predictable Nonverbal Response Pattern (18-18)	Rest (+)	0.79	0.007

*Table 2:
Relationship between occurrence of CAFIAS categories
and patterns and time of ALT-PE domains. Direction
of relationship designated to be positive (+) or negative
(-) for each ALT-PE domain.*

CAFIAS Category	Low #	Mid #	High #	Low %	Mid %	High %
Teacher Praise Verbal (2)	129 ± 56	108 ± 61	147 ± 101	5.1%	4.6%	5.2%
Teacher Praise Nonverbal (12)	14 ± 11	12.33 ± 5	26 ± 10	0.5%	0.5%	0.9%
Teacher Acceptance Verbal (3)	35 ± 17	27 ± 13	44 ± 30	1.4%	1.2%	1.5%
Teacher Acceptance Nonverbal (13)	2 ± 2	3 ± 3	1 ± 1	0.1%	0.2%	0%
Teacher Question Verbal (4)	48 ± 18	56 ± 18	50 ± 28	1.9%	2.5%	1.8%
Teacher Question Nonverbal (14)	2 ± 3	6 ± 4	2 ± 1	0.1%	0.3%	0.1%
Teacher Instruction Verbal (5)	596 ± 156	621 ± 204	853 ± 232	24%	28%	32%
Teacher Instruction Nonverbal (15)	229 ± 89	304 ± 196	443 ± 89	9.1%	14%	16%
Teacher Direction Verbal (6)	380 ± 123	292 ± 229	293 ± 161	15%	12%	10%
Teacher Direction Nonverbal (16)	18 ± 11	17 ± 13	13 ± 9	0.7%	0.8%	0.5%
Teacher Criticism Verbal (7)	43 ± 16	44 ± 8	55 ± 26	1.7%	1.9%	1.9%
Teacher Criticism Nonverbal (17)	2 ± 3	2 ± 2	3 ± 3	0.1%	0.1%	0.1%
Student Predictable Response Verbal (8)	78 ± 58	95 ± 75	43 ± 30	3.0%	4.0%	1.5%
Student Predictable Response Nonverbal (18)	643 ± 94	501 ± 258	514 ± 159	27%	22%	19%
Student Analytical Response Verbal (8\)	55 ± 41	33 ± 25	71 ± 56	2.5%	1.5%	2.5%
Student Analytical Response Nonverbal (18\)	41 ± 32	45 ± 56	81 ± 71	1.9%	1.8%	2.8%
Student Initiated Question Verbal (9)	44 ± 23	42 ± 32	57 ± 30	2.0%	1.9%	2.0%
Student Initiated Question Nonverbal (19)	6 ± 2	5 ± 4	4 ± 5	0.3%	0.2%	0.1%
Confusion (10)	32 ± 18	20 ± 14	21 ± 2	1.4%	0.9%	0.8%
Silence (20)	53 ± 35	51 ± 11	31 ± 7	2.4%	2.3%	1.1%

Table 3:
Mean ± standard deviation occurrence and percent values
for CAFIAS categories according to rank of the instructor:
Low (first degree black belt), Mid (second or third degree
black belt), and High (fourth degree and above black belt).
Values in red are notably different among rank level.

ALT-PE Domain	Low #	Mid #	High #	Low %	Mid %	High %
Wait	5 ± 5	8 ± 4	1 ± 1	1.5%	3.1%	0.2%
Transition	28 ± 13	25 ± 9	19 ± 9	9.1%	9.3%	5.9%
Management	30 ± 5	28 ± 20	21 ± 16	9.3%	10%	7.2%
Rest	13 ± 9	6 ± 5	10 ± 9	4.5%	2.3%	2.8%
Knowledge – Pause	0 ± 0	1 ± 2	1 ± 1	0%	0.5%	0.2%
Knowledge – Waiting	21 ± 16	11 ± 6	17 ± 5	6.3%	4.4%	5.3%
Knowledge – Off Task	3 ± 4	0 ± 0	0 ± 0	1.0%	0%	0%
Knowledge – Cognitive	45 ± 19	49 ± 35	68 ± 26	15%	20%	22%
Practice – Pause	2 ± 2	4 ± 4	3 ± 1	0.4%	1.5%	0.8%
Practice – Waiting	14 ± 10	19 ± 16	16 ± 8	4.2%	6.8%	4.8%
Practice – Off Task	0 ± 0	1 ± 1	4 ± 3	0%	0.2%	1.2%
Practice – Indirect	1 ± 1	19 ± 27	28 ± 12	0.1%	8.1%	8.9%
Practice – Motor Inappropriate	3 ± 3	2 ± 1	6 ± 7	0.9%	0.6%	2.0%
Practice – Motor Appropriate (ALT-PE)	88 ± 25	64 ± 23	82 ± 37	28%	24%	25%

Table 4:
Mean ± standard deviation number of six second periods
and percentage of total values for ALT-PE domains
according to rank of the instructor: Low (first degree black
belt), Mid (second or third degree black belt), and High
(fourth degree and above black belt). Values in red are
notably different among rank level.

CAFIAS Category	Partner #	Non-Partner #	Partner %	Non-Partner %
Teacher Praise Verbal (2)	81 ± 46	148 ± 65	3.3%	5.7%
Teacher Praise Nonverbal (12)	18 ± 12	17 ± 11	0.7%	0.6%
Teacher Acceptance Verbal (3)	23 ± 7	40 ± 21	0.9%	1.6%
Teacher Acceptance Nonverbal (13)	2 ± 4	2 ± 1	0.1%	0.7%
Teacher Question Verbal (4)	42 ± 25	54 ± 17	1.8%	2.2%
Teacher Question Nonverbal (14)	4 ± 5	3 ± 2	0.2%	0.1%
Teacher Instruction Verbal (5)	941 ± 82	569 ± 122	39%	23%
Teacher Instruction Nonverbal (15)	500 ± 53	237 ± 86	21%	9.2%
Teacher Direction Verbal (6)	145 ± 106	406 ± 95	5.6%	16%
Teacher Direction Nonverbal (16)	21 ± 13	14 ± 9	0.9%	0.5%
Teacher Criticism Verbal (7)	39 ± 2	50 ± 19	1.6%	2.0%
Teacher Criticism Nonverbal (17)	3 ± 3	2 ± 2	0.1%	0.1%
Student Predictable Response Verbal (8)	24 ± 24	93 ± 51	0.9%	3.7%
Student Predictable Response Nonverbal (18)	394 ± 223	634 ± 75	16%	26%
Student Analytical Response Verbal (8\)	49 ± 35	55 ± 45	2.1%	2.2%
Student Analytical Response Nonverbal (18\)	31 ± 19	64 ± 57	1.2%	2.5%
Student Initiated Question Verbal (9)	55 ± 29	44 ± 26	2.4%	1.8%
Student Initiated Question Nonverbal (19)	4 ± 5	5 ± 3	0.2%	0.2%
Confusion (10)	17 ± 7	29 ± 15	0.7%	1.2%
Silence (20)	41 ± 17	48 ± 27	1.8%	2.1%

Table 5:
Mean ± standard deviation occurrence and percent values
for CAFIAS categories according to type of class: partner
or non partner. Values in red are notably different
between types of class.

ALT-PE Domain	Partner #	Non-Partner #	Partner %	Non-Partner %
Wait	1 ± 2	6 ± 5	0.6%	2.0%
Transition	14 ± 3	29 ± 9	5.0%	9.6%
Management	16 ± 19	31 ± 8	6.0%	10.2%
Rest	7 ± 11	12 ± 7	1.9%	3.9%
Knowledge – Pause	1 ± 1	1 ± 2	0.2%	0.2%
Knowledge – Waiting	17 ± 5	17 ± 13	5.9%	5.2%
Knowledge – Off Task	0 ± 0	2 ± 3	0%	0.6%
Knowledge – Cognitive	85 ± 5	40 ± 16	31%	13%
Practice – Pause	3 ±	2 ± 3	1.0%	0.8%
Practice – Waiting	14 ± 8	17 ± 12	4.6%	5.4%
Practice – Off Task	2 ± 3	1 ± 2	0.7%	0.3%
Practice – Indirect	40 ± 9	3 ± 6	15%	1.1%
Practice – Motor Inappropriate	5 ± 7	3 ± 2	1.8%	0.9%
Practice – Motor Appropriate (ALT-PE)	53 ± 15	90 ± 24	18%	30%

Table 6:
Mean ± standard deviation number of six second periods and percent values for ALT-PE domains according to type of class: partner or non partner. Values in red are notably different between types of class.

DISCUSSION

Several statistically significant relationships between CAFIAS categories and response patterns were found with ALT-PE domains. The category of teacher verbal behavior and the pattern of teacher verbal (lecture) was positively associated with the cognitive engagement domain. This reflects the instructor lecturing to the students and each system is measuring a similar construct. The relationship is not perfect, possibly because of the time sampling method or because of the slight differences in the construct. The ALT-PE system uses a six-second interval whereas the CAFIAS uses a three-second interval, or when the behavior changes. The CAFIAS teacher verbal category is scored regardless of if an individual student is attentive or not, whereas the ALT-PE cognitive engagement domain is only scored if the student appears to be cognitively engaged. Teacher verbal behavior was also positively associated with the motor indirect domain whereas teacher nonverbal behavior was negatively associated with the motor indirect domain. Those classes which were partner in nature involved more motor indirect activities and were also more lecture-based with less teacher demonstration, which may explain this relationship. A robust qualitative analysis would be needed to establish the nature of this relationship. Teacher verbal and teacher nonverbal was negatively associated with the transition domain. It is possible those classes which had more instruction had fewer transitions as the activities remained more static. To confirm this, the number of different activities conducted during a lesson would be counted, which was beyond the scope of this study.

Student predictable verbal response was negatively associated with motor indirect and cognitive engagement domains. Predictable verbal responses were usually in the response of a call back to a command by the instructor associated with drills. For example, when the instructor calls the name of the form, 'Kihon kata shodan', the students verbally repeat the name to indicate they know the form they are about to do, 'Kihon kata shodan'. Those classes which focused on drills did not have partner work and did not involve as much lecture as classes with less drill work. Other studies have found that teachers who reduce partner work and cognitive engagement time increase the amount of time students are engaged in physical activity [Walker 1990, Randall 1989]. Student predictable nonverbal response as well as the pattern of teacher command and student predictable nonverbal response were negatively associated with motor indirect, supporting the finding that rote drill work was likely to be non-partner-based and did not involve as much teacher lecture.

CAFIAS categories share some characteristics with ALT-PE domains as demonstrated in this study. The CAFIAS measures the interaction between the instructor and the students Cheffers [1980] argues, which

does not provide information about what the students are doing. The ALT-PE system measures student activity [Metzler 1989: 225] but does not provide information about teacher activities or interactions. Using both in this study provides more complete data to understand instructional activities during the classes recorded. No other studies directly comparing the CAFIAS and ALT-PE system have been found. However, studies comparing teacher behavior with other systems and the ALT-PE system have documented that teacher behavior has relationships with ALT-PE domains [Hastie 1994, LaMaster 1993, Phillips 1983].

Although no statistical tests were applied to analyze difference among instructors according to rank, some apparent differences were evident and worthy of discussion. Instructors in the High rank group had appreciably less wait and transition time than instructors in the Low or Mid rank groups. Wait and transition time is presumably an undesirable use of classroom time, and studies have shown that interventions aimed at educating teachers can reduce wait and transition time [Hart 1983]. More effective teachers have been shown to spend less time on organizational tasks, such as waiting and transition, than less effective teachers [Phillips 1983]. This finding supports the hypothesis that High ranked instructors are more effective managers of the class time than instructors of Low or Mid rank.

Instructors in the High and Mid rank groups had appreciably more time with students cognitively engaged than instructors in the Low rank group. This may be attributed to the type of class run by each instructor. High ranked instructors spent more time lecturing (verbal instruction) than Mid ranked instructors, who spent more time lecturing than Low ranked instructors. High and Mid ranked instructors also spent more time demonstrating, with students observing and being cognitively engaged. One study documented more cognitive engagement by eight elementary physical education teachers (experienced, analogous to the High or Mid rank instructors) than eight elementary teachers in training (inexperienced, analogous to the Low rank instructors) [Griffey 1991].

Instructors in the High rank group elicited less predictable student verbal and non-verbal responses and stimulated more student analytical nonverbal response than instructors in the Low or Mid rank groups. This suggests that the classes of High rank instructors had better communication, encouraging students to participate in creative ways, which is similar to expert golf instructors [Schempp 2004]. Coaches of more satisfied basketball teams similarly created environments where creative student responses were more likely than with coaches of less satisfied teams [Fisher 1982]. Experienced physical education teachers also give more affective praise [Tan 1996].

Instructors in the High rank group had less silence than instructors in the Low and Mid rank groups. Silence is rare in modern martial arts classes except for an optional brief period of meditation at the beginning and end of class [Vertonghen 2012]. Instructors in the Low and Mid rank groups often incurred silence while they were considering the next class activity. In classes where teachers had one hour to plan a lesson versus 2 minutes, less silence has been observed [Imwold 1984]. It is possible the High rank instructors planned their lesson in more detail than the others, or their greater experience allowed them to adapt quickly to the class with minimal planning [Graham 1993, Griffey 1991, Kim 2010, Tan 1996]. Similarly, instructors in the Low rank group had more confusion than instructors in the Mid and High rank groups. This may reflect a lack of experience in managing the class when unanticipated events occur or not having a ready lesson plan, as Graham [1993] argues.

Instructors in the Low rank group had virtually no motor indirect time, indicating they rarely used partner exercises. Martial arts forms are typically conducted as individual student activities [Hopkins 2005]. Creating drills and opportunities for student to student interaction in the context of improving forms may require more experience as an instructor [Graham 1993]. Alternatively, the Low rank group may have been more focused on a traditional practice-mastery based class while the Mid and High rank groups may have focused on refining techniques already known through partner work.

Instructors in the Low rank group had more teacher verbal direction than instructors in the Mid and High rank groups. This is consistent with a direct instruction model that Metzler [2011] highlights where the instructor retains tight control over the class and gives orders expecting them to be followed precisely. This is also consistent with findings in coaches, where less successful coaches had a more direct coaching style [Rotsko 1979].

ALT-PE was not different among instructor rank groups. A lack of difference in ALT-PE between specialist teachers and classroom teachers delivering physical education classes has been documented previously [Placek 1986]. In that study, it was hypothesized that specialist instructors may select more appropriate tasks for the students without necessarily affecting their motor engagement time. van der Mars [1995] study showed no difference in ALT-PE between novice and expert physical education teachers hypothesized that the system may not be sensitive enough to detect differences in pedagogical approach. It is possible that the ALT-PE, while well correlated with student psychomotor skill acquisition [Ko 1986, Silverman 1985, Shaffner 1986], may not be capturing the full spectrum of knowledge students acquire in a physical skills class [Dodds 1994]. Therefore, the lack of difference between among instructor rank groups in ALT-PE

may not indicate that student achievement between them would also be equivalent.

Differences in instructor behaviors were noted among Low, Mid, and High ranked instructors. Low ranked instructors led classes in a direct instruction model without partner work and with many opportunities for practice. Mid ranked instructors led classes with more cognitive engagement than the Low ranked instructors but lacking the classroom management skills of the High ranked instructors. High ranked instructors led classes with less wait and transition time, less silence, more cognitive engagement time, and more elaborate student engagement. These findings support the hypothesis that High ranked instructors display characteristics consistent with being more skilled teachers than Mid ranked instructors, and that Mid ranked instructors display characteristics consistent with being more skilled teachers than Low ranked instructors.

Although all the instructors in this study had engaged in several teaching skills workshops for local martial artists, none were trained in physical education pedagogy in a formal setting, such as a university. It was expected that their teaching perspective came from the apprenticeship of observation as Schempp [1989] observes, student feedback, and self-reflection [Gilbert 2001]. The apprenticeship of observation is when a teacher's experience with teaching is shaped by their experience as a student. In martial arts, training is usually informal, like sports coaching [Mallett 2009]. In martial arts, acquisition of experience and content knowledge is the only route for improvement of pedagogical skill for most martial artists, as there are few formal teacher training programs. Because all the instructors in this study participated in the same instructor training course, they had been exposed to similar pedagogical methods in a didactic setting. Therefore, the differences observed can be more directly attributed to the differences in instructor rank. However, it is possible that higher ranked, more experienced instructors, were able to derive different information from the training courses than lower ranked instructors.

Several studies have documented that improving content knowledge improves pedagogical practice. In one, physical education teachers given a four-hour workshop on badminton showed improved student performance and pedagogical techniques compared with their teaching before the workshop [Ward 2015]. In another study, physical education teachers reported that their pedagogical activities in non-expert sports was less developed than their activities in sports in which they had expertise [Schempp 1998]. The findings from our study support those from the literature, where pedagogical technique improved progressively as a function of time in practice and continued acquisition of content knowledge between Low, Mid, and High ranked instructors.

During data analysis, it became evident that classes taught with regular use of partners produced noted differences from classes taught without partners. Most obvious was the difference in motor indirect- those classes with partners had dramatically higher motor indirect. Based on this observation, a comparison of these two class structures was warranted.

Non-partner classes had more teacher praise than partner classes. Behavior-specific praise is considered to be slightly effective for changing student behavior, whereas general praise has no effect [Brophy 1981]. The CAFIAS system does not distinguish between general praise and behavior-specific praise [Floress 2017]. Students in non-partner classes had more predictable verbal and nonverbal responses, analytical nonverbal responses, and ALT-PE. These students were more physically active, possibly creating more opportunities for the instructor to provide praise as feedback. The students may have also been responding predictably to the regular teacher direction given, which was much higher in non-partner classes than partner classes, and this created a sense of positive affect in the instructor, which prompted them to utter positive statements as Brophy [1981] observed.

Students in non-partner classes spent more time in transition, management, and rest than students in partner classes. This is consistent with the result that instructors gave more directions in non-partner classes. More rest time may have been necessary due to the higher intensity nature of the non-partner classes; in partner classes, one member of the pair is assisting rather than executing, creating natural rest periods. Transition and management may have been higher in non-partner classes due to a need to create more types of exercises [Oh 2014]. More instructor directions may have been given since the non-partner forms classes were traditionally conducted with the instructor giving a count for each move, whereas partner forms classes proceed without the instructor giving a count for students to progress to the next step.

Students in partner classes receive far more cognitive engagement, teacher talk, and teacher nonverbal instruction than students in non-partner classes. All of these are consistent with a more lecture-based class, typical of a partner form, possibly due to the complexity of the movements required of forms using a partner [De Cree 2013]. As expected, students in partner classes had dramatically more motor indirect time than students in non-partner classes.

Students in non-partner classes had higher ALT-PE than students in partner classes. Within the two schools involved in this study, the minimum time required to earn a black belt in a striking art (e.g. karate) is 3 years, and the minimum time required to earn a black belt in a

throwing art (e.g. aikido) is 5 years. This disparity may be explained by the relative ALT-PE of partner (throwing art) and non-partner (striking art) classes. In partner classes, much of the time is spent in support of the primary learner, so the assisting partner is not actively engaged in learning. It is possible that the longer time to earn the same rank is due to this lower ALT-PE in partner classes. Involvement of a partner is required, as without a partner learning throwing technique is not as effective [Gomes 2002]. In one study of physical education teachers undertaken by Walker [1990] an increase in ALT-PE was achieved partly by reducing partner work.

CONCLUSION

No interaction system has been applied to collecting systematic observational data about a martial arts class. The CAFIAS was chosen as the most relevant system for evaluating teacher-student interactions in a psychomotor skills acquisition setting. No study comparing the teaching behaviors based on the experience level of the martial artist, as defined by their rank level, has been conducted. The ALT-PE system was selected because it has a rich history of research use and validation and has been used in other studies comparing teachers of varying levels. This would allow for comparisons between the findings of this study and previous studies. No study could be found which used both the CAFIAS and ALT-PE system, and the opportunity to compare results from two systems with a rich history of use in research was novel.

The study had several strengths. While participants for this study were selected on the basis of convenience and knowledge of the two schools involved in the study, all completed a certified instructor training course (CIT), which equated them on knowledge content. Thus, rank-related differences in instruction can be attributed to instructor's past and experiences and the ability to translate the knowledge into practice. There were more than eight martial arts schools in the urban setting at the time of this study. The schools chosen had a relationship with the author and could be relied upon to participate. Furthermore, the author knew the capabilities of the participants, types of classes, and physical layout of the schools which participated. Another strength was the use of quantitative observation methods in the form of the CAFIAS and the ALT-PE system. Observations which may have been of a qualitative nature may have helped inform interpretation of the quantitative results.

A single observer performed coding of the videos for CAFIAS and the ALT-PE system. It is possible personal bias may have been reduced by using more than one observer. However, including more than one

observer would have introduced inter-observer variability and may have resulted in lower intra-observer reliability. The extremely high intra-observer correlation in this study suggests that, if personal bias was present, it was consistently applied.

Limitations of the study include its small sample size and corresponding data analysis challenges. Using a larger sample from a varied number of martial arts schools would allow for statistical comparisons to be made and results to be extrapolated to the general population. Similarly, these results may not be applicable to settings outside of the United States. Adding a qualitative systematic observation would provide more data to put the results in context. Comparing student skill acquisition in partner and non-partner classes may improve understanding in the difference in skill and rank advancement between partner martial arts (e.g., judo, aikido) and non-partner martial arts (e.g., karate, Kyuki-Do). Comparing martial arts teachers who have and have not had any formal teacher training would help determine the usefulness of such training.

A further limitation is that participants were given little direction with regards to the class to be taught. There was variability in warm up time and type of class taught, and this variability was inconsistent across rank levels. It is possible this additional variability introduced bias into the results. Selecting instructors who taught the same type of class (e.g. all non-partner) and providing more specific direction about warm-up time may have minimized this variability. Participants volunteered to participate, and this may have created a selection bias towards instructors who were more comfortable being recorded. It is possible lower-performing instructors did not volunteer and the data may not reflect all instructors at the selected schools.

In summary, the result suggest that instructors of Low rank should practice transitioning their instructional strategy from a direct instruction method to a more dynamic, communicative structure using more teacher instruction, encouraging thoughtful responses in students, and fewer direct commands. Instructors of Mid rank should consider engaging in more planning activities in order to minimize the amount of classroom time spent in silence, waiting, or in transition. Instructors of High rank displays characteristics consistent with proficient and expert teachers and should continue to teach classes as they have been.

REFERENCES

- Berliner, David. 1975. *The Beginning Teacher Evaluation Study: Overview and Selected Findings, 1974-1975*. San Francisco: Far West Regional Laboratory for Educational Research and Development.
- Berliner, David. 1988. 'The Development of Expertise in Pedagogy'. Charles W. Hunt Memorial Lecture presented at the Annual Meeting of the American Association of Colleges for Teacher Education (New Orleans, LA, February 17-20, 1988) ED 298 122
- Brophy, Jere. 1981. 'Teacher Praise: A Functional Analysis'. *Review of Educational Research*, 51, 5-32.
doi.org/10.3102/00346543051001005
- Brophy, Jere and Thomas Good. 1986. 'Teacher Behavior and Student Achievement'. In *Handbook of Research on Teaching*, edited by M.C. Wittrock, 328-375. New York: Macmillan.
- Cheffers, John, Mancini, Victor, and Thomas Martinek. 1980. *Interaction Analysis: An Application to Nonverbal Activity*. Minneapolis: Association for Productive Teaching.
- De Créé, Carl. 2013. 'Shōnen Jūdō-no-kata [‘Forms of Jūdō for Juveniles’] An Experimental Japanese Teaching Approach to Jūdō Skill Acquisition in Children Considered from a Historic Pedagogical Perspective Part II'. *Journal of Combat Sports & Martial Arts*, 4, 95-111.
doi.org/10.5604/20815735.1090653
- Czarnecka, Marzena. 2001. 'The Saga of the Modern Martial Arts Student Instructor Relationship in North American Schools'. *Journal of Asian Martial Arts*, 10, 18-35.
- Dodds, Patt. 1994. 'Cognitive and Behavioral Components of Expertise in Teaching Physical Education'. *QUEST*, 46, 153-163.
doi.org/10.1080/00336297.1994.10484117
- Fisher, A. Craig, Mancini, Victor, Hersch, Ronald, Prouix, Thomas, and Ellen Staurowsky 1982. 'Coach-athlete Interactions and Team Climate'. *Journal of Sport Psychology*, 4, 388-404.
doi.org/10.1123/jsp.4.4.388
- Flanders, Ned. 1970. *Analyzing Teaching Behavior*. Reading: Addison-Wesley.
- Floress, Margaret, Beschta, Shelby, Meyer, Kari, and Wendy Reinke. 2017. 'Praise Research Trends and Future Directions: Characteristics and Teacher Training'. *Behavioral Disorders*, 43, 227-243.
doi.org/10.1177/0198742917704648
- Gilber, Wade and Piere Trudel. 2001. 'Learning to Coach Through Experience: Reflection in Model Youth Sport Coaches'. *Journal of Teaching in Physical Education*, 21, 16-34.
doi.org/10.1123/jtpe.21.1.16
- Gomes, Fabio, Meira Jr, Cassio, Franchini, Emerson, and Go Tani. 2002. 'Specificity of Practice in Acquisition of the Technique of o-soto-gari in Judo'. *Perceptual and Motor Skills*, 95, 1248-1250.
doi.org/10.2466/pms.2002.95.3f.1248
PMid:12578266
- Graber, Kim. 2001. 'Research on Teaching Physical Education'. In *Handbook of Research on Teaching*, edited by V. Richardson, 491-519. Washington: American Education Research Association.
- Graham, George, Hoppe Christine, Manross, Mark, and Tom Sitzman. 1993. 'Novice and Experienced Children's Physical Education Teachers: Insights into Their Situational Decision Making'. *Journal of Teaching in Physical Education*, 12, 197-214.
doi.org/10.1123/jtpe.12.2.197
- Griffey, David and Lynn Housner. 1991. 'Differences Between Experienced and Inexperienced Teachers' Planning Decisions, Interactions, Student engagement, and Instructional climate'. *Research Quarterly for Exercise and Sport*, 62, 196-204.
doi.org/10.1080/02701367.1991.10608710
PMid:1925043
- Hart, Claire. 1983. 'The Effects of Modification of Teacher Behavior on the Academic Learning Time of Selected Students in Physical Education', Unpublished doctoral dissertation, The Ohio State University.
- Hastie, Peter. 1994. 'Selected Teacher Behaviors and Student ALT-PE in Secondary School Education'. *Journal of Teaching in Physical Education*, 13, 242-259.
doi.org/10.1123/jtpe.13.3.242
- Hopkins, Giles. 2005. 'The Teaching of Goju-ryu kata: A Brief Look at Methodology and Practice'. *Journal of Asian Martial Arts*, 14, 52-69.
- IBIS World. (n.d.). *Martial Arts Studios - US Market Research Report*. Accessed March 04, 2018, from <https://www.ibisworld.com/industry-trends/specialized-market-research-reports/consumer-goods-services/education-providers/martial-arts-studios.html>

Imwold, Charles, Rider, Robert, Twardy, Bernadette, Oliver, Pamela, and Michael Griffin. 1984. 'The Effect of Planning on the Teaching Behavior of Preservice Physical Education Teachers'. *Journal of Teaching in Physical Education*, 4, 50–56.

doi.org/10.1123/jtpe.4.1.50

Kim, Ha-Young and Lynn Housner. 2010. 'The Influence of Class Size on the Planning, Decision Making, Concerns, and Instructional Behaviors of Experienced and Inexperienced Teachers'. *International Journal of Applied Sports Sciences*, 22, 77–95.

doi.org/10.24985/ijass.2010.22.2.77

Ko, Byung-Kyo. 1986. 'The Relationships Among Student Achievement, Academic Learning Time in Physical Education (ALT-PE), and Selected Student Characteristics in Two University Tae Kwon Do Classes' Unpublished doctoral dissertation, Syracuse University.

LaMaster, Kathryn and Alan Lacy. 1993. 'Relationship of Teacher Behaviors to ALT-PE in junior high school physical education'. *The Journal of Classroom Interaction*, 28, 21–25.

Mallett, Clifford, Trudel, Pierre, Lyle, John, And Steven Rynne. 2009. 'Formal vs. Informal Coach Education'. *International Journal of Sports Science and Coaching*, 4, 325–334.

doi.org/10.1260/174795409789623883

Metzler, Michael. 1989. 'The ALT-PE Microcomputer Data Collection System (MCDCS)'. In *Analyzing Physical Education and Sport Instruction*, edited by Paul Darst, Dorothy Zakrajsek and Victor Mancini, 225–232. Champaign: Human Kinetics Books.

Metzler, Michael. 2011. *Instructional Models for Physical Education*. Scottsdale: Holcomb Hathaway.

Oh, Hyun-Ju. 2014. 'Taekwondo Instructional and Assessment Strategies in Authentic Settings'. *Journal of Physical Education, Recreation & Dance*, 85, 36–42.

doi.org/10.1080/07303084.2014.857552

Phillips, D. Allen and Cynthia Carlisle. 1983. 'A Comparison of Physical Education Teachers Categorized as Most and Least effective'. *Journal of Teaching in Physical Education*, 2, 55–67.

doi.org/10.1123/jtpe.2.3.55

Placek, Judith and Lynda Randall. 1986. 'Comparison of Academic Learning Time in Physical Education: Students of Specialists and Nonspecialists'. *Journal of Teaching in Physical Education*, 5, 157–165.

doi.org/10.1123/jtpe.5.3.157

Randall, Lynda and Charles Imwold. 1989. 'The Effect of an Intervention on Academic Learning Time Provided by Preservice Physical Education Teachers'. *Journal of Teaching in Physical Education*, 8, 271–279.

doi.org/10.1123/jtpe.8.4.271

Rotsko, Alexander. 1979. 'A Comparison of Coaching Behaviors of Successful and Less Successful Coaches' Master's Thesis, Ithaca College.

Schempp, Paul. 1989. 'Apprenticeship-of-observation and the Development of Physical Education Teachers'. In *Socialization into Physical Education: Learning to Teach*, edited by Thomas Templin and Paul Schempp, 1338. Indianapolis: Benchmark Press, Inc.

Schempp, Paul, McCullick, Bryan, St. Pierre, Peter, Woorons, Sophie, You, JeongAe, and Betsy Clark. 2004. 'Expert Golf Instructors' Student Teacher Interaction Patterns'. *Research Quarterly for Exercise and Sport*, 75, 60–70.

doi.org/10.1080/02701367.2004.10609134

PMid:15532362

Shaffner, Paul. 1986. 'A Comparison of Academic Learning Time: Physical Education of Starting and Non-Starting Collegiate Football Players' Master's Thesis, Ithaca College.

Silverman, Stephen and Craig Buschner. 1990. 'Validity of Cheffers Adaptation of Flanders Interaction Analysis System'. *The Journal of Classroom Interaction*, 25, 23–28.

Tan, Steven. 1996. 'Differences Between Experienced and Inexperienced Physical Education Teachers' Augmented Feedback and Interactive Teaching Decisions'. *Journal of Teaching in Physical Education*, 15, 151–170.

doi.org/10.1123/jtpe.15.2.151

van der Mars, Hans. 1989. 'Systematic Observation: An Introduction'. In *Analyzing Physical Education and Sport Instruction*, edited by Paul Darst, Dorothy Zakrajsek, & Victor Mancini, 3–18. Champaign: Human Kinetics Books.

van der Mars, Hans, Vogler, E. Williams, Darst, Paul, and Barbara Cusimano. 1995. 'Novice and Expert Physical Education Teachers: Maybe They Think and Decide Differently... But Do They Behave Differently?' *Journal of Teaching in Physical Education*, 14, 340–347.

doi.org/10.1123/jtpe.14.3.340

Vertonghen Jikkemien, Theebom Marc, and Marc Cloes. 2012. 'Teaching in Martial Arts: The Analysis and Identification of Teaching Approaches in Youth Martial Arts Practice'. *Archives of Budo*, 8, 191–202. doi.org/10.12659/AOB.883502

Walker, Robert. 1990. 'A Pilot Study to Improve Academic Learning Time in Physical Education' Unpublished Bachelor's Thesis, Western Australia College of Advanced Education.

Ward, Phillip, Kim, Insook, Ko, Bomna, and Weidong Li. 2015. 'Effects of Improving Teacher's Content Knowledge on Teaching and Student Learning in Physical Education'. *Research Quarterly for Exercise and Sport*, 86, 130–139. doi.org/10.1080/02701367.2014.987908
PMid:25539283

Weise, Paul. 1995. 'Development and Validation of Assessment Devices for Martial Arts Instructors' Doctoral Thesis, University of South Alabama.

Zeng, Howard, Leung, Raymond, and Michael Hipscher. 2010. 'An Examination of Teaching Behaviors and Learning Activities in Physical Education Class Settings Taught by Three Different Levels of Teachers'. *Journal of Social Sciences*, 6, 18–2. doi.org/10.3844/jssp.2010.18.28

ABOUT THE JOURNAL

Martial Arts Studies is an open access journal, which means that all content is available without charge to the user or his/her institution. You are allowed to read, download, copy, distribute, print, search, or link to the full texts of the articles in this journal without asking prior permission from either the publisher or the author.

The journal is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Original copyright remains with the contributing author and a citation should be made when the article is quoted, used or referred to in another work.



Cardiff University Press

Gwasg Prifysgol Caerdydd

Martial Arts Studies is an imprint of Cardiff University Press, an innovative open-access publisher of academic research, where 'open-access' means free for both readers and writers.
cardiffuniversitypress.org

Journal DOI

10.18573/ISSN.2057-5696

Issue DOI

10.18573/mas.i9

Accepted for publication 11 March 2020

Martial Arts Studies

Journal design by Hugh Griffiths

MARTIALARTSSTUDIES.ORG

TWITTER.COM/MASTUDIES

MARTIAL ARTS STUDIES

EDITORS

Paul Bowman
Benjamin N. Judkins

EDITORIAL ASSISTANTS

Qays Stetkevych
John Tasker

To discuss publication or to submit
a paper please contact:

martial.arts.studies@gmail.com

EDITORIAL ADVISORY PANEL

Oleg Benesch *University of York*
Stephen Chan *SOAS*
Greg Downey *Macquarie University*
D.S. Farrer *University of Guam*
Adam Frank *University of Central Arkansas*
Thomas A. Green *Texas A&M University*
T. J. Hinrichs *Cornell University*
Leon Hunt *Brunel University London*
Felipe P. Jocano Jr *University of the Philippines*
Gina Marchetti *Hong Kong University*
Meaghan Morris *The University of Sydney*
Daniel Mroz *University of Ottawa*
Meir Shahaar *Tel Aviv University*
Dale Spencer *Carleton University*
Douglas Wile *Alverno College*
Phillip Zarrilli *Exeter University, Emeritus*