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Inter-observer evaluation of practical lesson delivery in physical education setting: Nature and demonstration of teachers' instructional cues

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Abstract

Often, teachers plan for instructional activities, yet fail to plan for instructional cues they would use to facilitate skill acquisition among students. During practical lesson delivery, it is ideal for instructional cue (IC) of the teacher to be short, descriptive and integrated in a manner that promotes students' retention of relevant information for executing the skill correctly. Teachers should avoid lengthy and unnecessary ICs in teaching and learning environment. In this pedagogical study, we used descriptive processes to investigate the nature and demonstration of teachers' ICs, the proportion and rate per minute of teachers' ICs in practical physical education (PE) setting involving pre-service teachers (n=77) and professional PE teachers (n=4). Self-developed event recording instrument was found valid using expert consultation procedure. In each recorded event, inter-observer agreement was above 80% which indicated a good reliability of data for making research decisions. Evaluation of the video-recorded lesson suggested that teachers were able to utilise a variety of instructional cues (i.e., short, descriptive and integrated) to facilitate students' learning in practical PE setting. Findings indicated that teachers were largely able to simulate skills and techniques during practical lesson delivery. Again, verbal instructional cues demonstrated with equipment occupied the largest proportion of events, while verbal instructional cues demonstrated without equipment placed second. Non-verbal instructional cues demonstrated without equipment occupied the least proportion of events in the entire observation. Generally, the study revealed a normal phenomenon in practical PE setting where verbal cues occurred more frequently than non-verbal cues. The practical PE class is usually composed of high and low prior learners. It was recommended that cues delivered by the teacher should cater for such individual differences in every practical PE setting.

Keywords: Teaching cues, pedagogy, inter-observer evaluation, instructional setting

1. Introduction

Pedagogical research in the field of physical education (PE) suggests that "researchers and practitioners have long been interested in the types of instructional cues that facilitate the performance and learning of motor skill" (Becker & Fairbrother, 2019, p.651) [2]. Several educational researchers have also espoused the importance of instructional cues in teaching and learning environment (Alpizar *et al.* 2020 Donkor, Avornyo *et al.* 2021; Hurzlmeier, *et al.*, 2021; Mayer, 2014; Raisbeck & Yamada, 2019; Richter, *et al.* 2016; Schneider *et al.*, 2018) [1, 4, 8, 11, 14, 15, 16]. From his work on motor learning and development, Pufaa (2006) indicates that any task involving a motor activity or a motor skill is known as motor task. A task system is a regularized pattern for accomplishing tasks which tend to recur frequently with physical education (Siedentop & Tannehil, 2000) [17]. Therefore, every motor task in PE setting requires relevant cues to facilitate students' learning.

1.1 Nature, Demonstration and Integration of Cues in Physical Education Setting

Sometimes, the teacher's IC could be lengthy than necessary in practical teaching and learning environment. This situation does not depict effective teaching. According to literature, effective teachers should demonstrate "pedagogical knowledge that is able to meet the increasing demands associated with the instructional task" (Donkor, 2021, p.259) [7].

To avoid giving unnecessary information about execution of a skill being taught, it is better for the cue to be as short as possible. In situations where students need to focus on a particular aspect of the skill being taught, teachers can use cues that contain short words to maximize success rate of students in executing the skill. For instance, in teaching netball shooting skill, the teacher could simply say:

“Keep eyes on the ring”
 “Keep head high”
 “Keep your back straight”

It is commonly noticed among teachers praising tasks executed successfully by students during practical lessons without actually communicating what learners have done right. As much as possible, teacher’s IC should be adequately descriptive in a manner that communicates the exact information needed for learners to execute the skill correctly. During practical lesson delivery, teachers often use praises such as “good”, “nice”, “well done”, “great performance”, etc. All these praises do not descriptively communicate the exact elements that make the movement task great or good as portrayed by the teacher. In netball shooting situation, students could be missing targets as a result of not doing something right. In an instance like this, it is the responsibility of the teacher to describe what learners need to do in order to maximize success rate in performing a movement task. For example, in teaching shooting skill in netball, the teacher could say:

“snap your wrist,”
 “follow through” etc.

In teaching and learning environment, it is a good practice for teachers to integrate cues to help learners remember the correct sequence of executing the skill. In doing so, effective utilization of cues in pedagogical setting is demonstrated when a teacher communicates critical information about the skill in totality. In this instance, the cue of the teacher should contain words that communicate to the learner the execution

procedures involved in the skill as a whole and not just part(s) of the skill. Examples of integrated cues in netball setting could be:

“Catch, step, and throw”
 “Step, rotate, and throw”
 Pivot, step, and throw
 Catch, step, and shoot

According to literature, learners should be helped to establish an image of the task or skill through instructions provided by the teacher (Pufaa, 2006). The teacher may over-use instructions when faced with the task of describing a complex movement. However, Pufaa notes that too many instructions “may overwhelm learners and in an effort to cope with the avalanche of information about what to do and when to do it, may disregard much of the information” (p.33).

1.2 Purpose of the Study

The purpose of this pedagogical study was to use descriptive processes to investigate the nature and demonstration of teachers’ instructional cues, the rate per minute and proportions of teachers’ instructional cues used in practical PE setting involving pre-service teachers and professional PE teachers.

2. Methods

2.1 Participants

Participants were first year pre-service teachers (males=24, females=53) and professional PE teachers (males=4). All participants were drawn from three colleges of education. Participants were assigned different roles. As part of inclusion criteria, pre-service teachers used for the study were those that had not previously participated in competitive netball activities (novice shooters in netball). This was particularly important in determining the influence of teachers’ IC on shooting skill using two instructional schedules (with teachers’ IC & without teachers’ IC). Table 1 specifies the composition of subjects involved in the study.

Table 1: Study Participants

Gender	Group A	Group B	Group C	Total	Percent. (%)
Male	4	2	22	28	35
Female	0	30	23	53	65
Total	4	32	45	81	100

Group labels	
Group A:	Professional PE teachers whose mandate was to teach shooting skill using IC.
Group B:	Pre-service teachers involved in the 30 minutes lesson for each of the two observed classes.
Group C:	Pre-service teachers involved in the two schedules of teaching (with teachers’ IC and without teachers’ IC) to determine the effects of IC on shooting.

2.2 Procedures

We based our data collection efforts on the nature and demonstration of teachers’ instructional cues in a practical lesson involving pre-service teachers from three selected colleges of education. Using descriptive processes, digital video recording was utilized to capture classroom interactions in natural PE setting. For the purposes of collecting sets of data, three groups were created for the study participants. Group A was made up of PE teachers (n=4) whose responsibility was to use IC in teaching shooting skill in practical PE setting. Group B was made up of pre-service teachers (n=32) who were involved in 60 minutes lesson.

Subjects in group B were further divided into two classes of 16 subjects each. Each of the two classes was taught by a different teacher for 30 minutes. Group C was made up of pre-service teachers (n=45). Subjects of group C were taught by two teachers using two teaching schedules that determined the influence of teachers’ IC on netball shooting skill (i.e., teaching schedules with IC and without IC). Precisely, two teachers were involved in the practical lesson delivery and two other teachers were involved in the teaching schedule that determined the influence of teachers’ IC on shooting skill in netball.

3. Analyses

Data were descriptively analysed using inter-observer means, percentages and chat. Accuracy checks were conducted for all categories of data by comparing observed values on the data sheets. Inter-observer reliability checks between the two independent recorders were also carried out. A frequently used indicator for testing reliability of event recording instrument of this nature is inter-observer agreement score between two independent recorders (Donkor, Nyavor, Addai-Tuffour, *et al.* 2021; Donkor, Nyavor, Atsu, *et al.*, 2021) [6, 7]. Several categories of teacher behavior can be observed via event recording instrument for an entire teaching session. Data collected via event recording can be converted to rate per minute (Donkor, Avornyo, *et al.*, 2021; Siedentop & Tannehill, 2000) [4, 17]. Traditionally, the calculation of inter-Observer Agreement (IOA) has been:

$$\frac{\text{Agreement}}{\text{Agreement} + \text{Disagreement}} \times 100 = \% \text{ of agreement}$$

Inter-observer agreement (IOA) of at least 80% is usually required for the data collected via event recording format (Siedentop & Tannehill, 2000) [17]. In the current situation, data reliability was above 80% in each case.

4. Results

4.1 Teachers' Verbal IC

From the independent documentation of events, observer one recorded 19 events for short verbal ICs while observer two recorded 16 events for the same category. The two observers achieved inter-observer mean of 17.5 events with 84% data agreement between the two independent recorders. In terms of descriptive verbal ICs, 45 events were recorded for observer one and 42 events for observer two. The inter-observer mean for these two observations was 43.5 events which yielded 93% inter-observer agreement. For integrated verbal IC, 36 and 37 events were recorded by the first and second observers respectively. The inter-observer mean for this category was 36.5 events with 97% inter-observer agreement. Table 2 presents the nature of teachers' verbal ICs in practical physical education setting.

Table 2: Nature of Teachers' Verbal IC

Nature of Teachers' IC Demonstrated in Practical PE Setting	Observation			Data Reliability	
	Observer 1	Observer 2	Mean Score	Equation	Percent. (%)
Short	19	16	17.5	$\frac{16}{16+3} \times 100$	84
Descriptive	45	42	43.5	$\frac{42}{42+3} \times 100$	93
Integrated	36	37	36.5	$\frac{36}{36+1} \times 100$	97
Total	100	95	97.5	$\frac{95}{95+5} \times 100$	95

4.2 Rate per Minute of Short, Descriptive and Integrated ICs Provided by Teachers in Practical Teaching and Learning Environment

From table 3, the mean count of events for the two independent recorders was 17.5 for verbal cues that by nature were short, which occurred at 0.3 per minute. Descriptive verbal IC recorded an inter-observer mean of 43.5 events,

which occurred at the rate of 0.7 per minute. In the case of integrated IC, the inter-observer mean was 36.5 events, which was provided by the teachers at the rate of 0.6 per minute. In total, inter-observer mean of 97.5 events were provided during the practical lesson delivery at the rate of 1.6 per minute. Table 3 presents the results on the rate per minute of teachers' ICs during the one-hour lesson.

Table 3: Rate per Minute of Short, Descriptive and Integrated ICs of Teachers Length of observation= 1hr (60 minutes)

Nature	Inter-Observer Mean Score	Equation	Rate Per Minute
Short	17.5	$\frac{17.5}{60}$	0.3
Descriptive	43.5	$\frac{43.5}{60}$	0.7
Integrated	36.5	$\frac{36.5}{60}$	0.6
Total	97.5	$\frac{97.5}{60}$	1.6

4.3 Proportions of Teachers' ICs Demonstrated in Practical PE Setting

Inter-observer analysis of data showed that a high percentage of teachers' IC (43.5 events) were descriptive, followed by

integrated IC (36.5 events) and short IC as the least. Figure 1 presents pictorial proportions of the nature of teachers' IC during the one-hour practical lesson delivery.

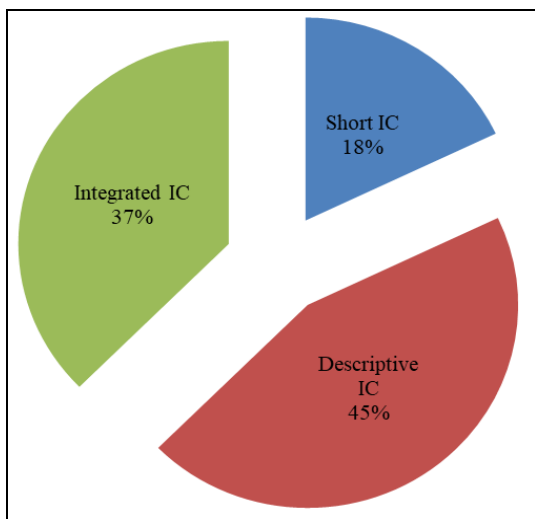


Fig 1: Proportions of teachers' IC demonstrated in practical PE setting

4.4 Demonstration of Teachers' ICs with Equipment and without Equipment

From table 5, observer one recorded 46 events for verbal IC that were demonstrated with equipment (ball) while observer two documented 44 events for this same category. A inter-observer mean of 45 events were produced with 96% inter-observer data agreement for verbal ICs demonstrated with equipment.

For non-verbal IC demonstrated with equipment, both observers recorded 6 events each resulting in 100% inter-observer data agreement for this category. In the category of verbal ICs demonstrated without equipment, 39 and 36 events were recorded by observer one and two respectively with 92% inter-observer data agreement for this category. Non-verbal ICs demonstrated without equipment were 7 events for observer one and 6 events for observer two. Data for this category was 94% reliable. Table 4 presents results on teachers' demonstration with equipment (ball) and without equipment (ball) using ICs.

Table 4: Demonstration of Teachers' ICs with Equipment and without Equipment

Demonstration	Type	Observer1	Observer2	Inter-Observer Mean Score	Inter-Observer Reliability of Data	
					Equation	Percent. (%)
With Equipment (ball)	Verbal	46	44	45	$\frac{44}{44+2} \times 100$	95
	Non-verbal	6	6	6	$\frac{6}{6+0} \times 100$	100
Without Equipment (ball)	Verbal	39	36	37.5	$\frac{36}{36+3} \times 100$	92
	Non-verbal	7	6	6	$\frac{6}{6+1} \times 100$	86

4.5 Rate per Minute of Teachers' ICs Demonstrated with Equipment and without Equipment

From table 5, inter-observer mean of 95 events was recorded for all categories of teachers' ICs demonstrated with equipment and without equipment. These demonstrations of teachers' ICs with equipment and without equipment occurred at the rate of 1.6 events per minute in the one-hour lesson observed. Verbal ICs demonstrated without equipment recorded inter-observer mean of 45 events which occurred at the rate of 0.8% per minute. Non-verbal ICs demonstrated

with equipment produced inter-observer mean of 6 events administered by the professional PE teachers at the rate of 0.1 per minute. Verbal cues demonstrated without equipment produced inter-observer mean of 37.5 events which occurred at the rate of 0.6 per minute. Inter-observer mean for non-verbal ICs demonstrated without equipment were 6.5 events which occurred at the rate of 0.1 per minute. Table 5 presents rate per minute of teachers' demonstration with equipment and without equipment.

Table 5: Rate per Minute of Teachers' IC Demonstrated with Equipment and without Equipment

Demonstration	Type	Inter-Observer Mean Score	Equation	Rate Per Minute
With Equipment (ball)	Verbal IC	45	$\frac{45}{60}$	0.8
	Non-verbal IC	6	$\frac{6}{60}$	0.1
Without Equipment (ball)	Verbal IC	37.5	$\frac{37.5}{60}$	0.6
	Non-verbal IC	6.5	$\frac{6.5}{60}$	0.1
Overall		95	$\frac{95}{60}$	1.6

5. Discussion

The purpose of this pedagogical study was to use descriptive processes to investigate the nature and demonstration of

teachers' instructional cues, the rate per minute and proportions of teachers' instructional cues in practical PE setting involving pre-service teachers and professional PE

teachers.

Findings from the study revealed the ability of teachers to utilize a variety of instructional cues (i.e., short, descriptive and integrated) in teaching and learning situations. Earlier study suggests that “different types of teachers’ ICs must be provided in an instructional setting” (Donkor, Avornyo *et al.* 2021, p.135) [4]. Cues enhance the attention or focus of learners by restricting what they need to think about. Findings from the current study revealed a positive attitude of teaching where in each minute, the professional PE teachers provided instructional cues which by nature could be described as short, descriptive or integrated. In order of magnitude, it was realized that descriptive instructional cues were mostly used by the teachers followed by integrated instructional cues and short instructional cues. The findings revealed a normal phenomenon where the use of verbal cues was more than the use of non-verbal cues in practical PE setting.

According to the findings, teachers were largely able to simulate skills and techniques during practical lesson delivery. This is particularly useful in situations where teaching and learning materials are inadequate for practical demonstrations during lesson delivery. In situations like this, physical education teachers depend heavily on demonstrations without equipment and communicate the proper technique of the movement task to the learners. As acknowledged by Donkor and Hormenu (2021) [5, 5], it is the critical role of teachers to help students acquire knowledge and skills necessary for fostering positive attitude to instructional task. Findings also revealed that verbal instructional cues demonstrated with equipment occupied the largest proportion with 45 events, while verbal instructional cues demonstrated without equipment placed second proportion with 37.5 events. This is followed by non-verbal instructional cues demonstrated without equipment with 6.5 events. The least demonstrated instructional cues were non-verbal instructional cues demonstrated with equipment which produced 6 events in the entire observation. Generally, performance of a skill is greatly influenced by individual’s attention to the task. As Wuest and Bucher (2003) state: “An individual must locate, select, and focus on relevant cues to be successful in performing the task (skill or game)” (p.392).

Literature suggests that instructional cue “plays an important role in directing students’ attention toward the most critical information about a movement task” (Donkor, Avornyo *et al.*, 2021, p.235) [4]. Cues improve attention, (Becker & Fairbrother, 2019) [2], result in smooth and coordinated movement (Klein *et al.*, 2019) [10] and are generally necessary for understanding and solving movement tasks in teaching and learning environment (Hurzlmeier, 2021) [8]. Even though instructional cues provided by teachers are able to enhance understanding of critical skill points, study contrastingly suggests that cues presented in multiple modalities are redundant for learners possessing high knowledge of a task being taught and that “instructional techniques that are highly effective with inexperienced learners can lose their effectiveness and even have negative consequences when used with more experienced learners” (Kalyuga, 2009, p.23) [9]. As advocated in earlier study, teachers should possess “adequate and relevant knowledge, skills and attitudes to enable them function effectively in full-time teaching career” (Donkor, 2021, p.259) [8].

Naturally, students understand concepts better when teachers communicate them clearly and developmentally. For this reason, it is important for teachers to possess considerable knowledge of subject matter relating to instructional practice

in physical education setting (Donkor, Appiah, *et al.* 2021) [7]. As acknowledged by Donkor and Hormenu (2021) [5, 5], it is the critical role of teachers to help students acquire knowledge and skills necessary for fostering positive attitude to instructional task in physical education environment.

6. Conclusions

In every pedagogical setting in physical education, learners need clear understanding of critical skill points to be able to perform a motor task effectively. Based on the study, it was concluded that teachers were able to utilise a variety of instructional cues (i.e., short, descriptive and integrated) to facilitate students’ learning in the practical PE setting. It was also concluded that teachers were largely able to simulate skills and techniques during the practical PE lesson delivery. It was observed that verbal instructional cues demonstrated with equipment occupied the largest proportion of events, while Non-verbal instructional cues demonstrated without equipment occupied the least proportion of events in the entire observation. Generally, teachers used verbal cues more frequently than non-verbal cues. From the study, Instructional cues of the teacher remain prominent pedagogical strategy in facilitating skill acquisition among students.

7. Recommendations

For improvement in utilization of instructional cues in pedagogical setting, the following recommendations were made based on the results.

1. The practical PE class is usually composed of high and low prior learners, experienced and inexperienced learners. Therefore, we recommend that cues delivered by the teacher should cater for such individual differences in every practical PE setting. It is also necessary for teachers to adopt variety of instructional cues to engage students during lesson delivery.
2. While some cues could be highly effective, others could be problematic. Therefore, teachers of PE should adopt teaching cues that work best in a particular instructional situation.
3. The primary goal of teachers’ instructional cue is to improve learning of a motor task. As a result, cues used by the teacher should be specific to the skill being taught.

8. Contribution of Authors

1. Samuel Kofi Donkor, PhD – Conception and design of the study
2. The rest of the authors contributed to various phases of the study involving manuscript review, data interpretation and presentation, results write-ups and discussion of findings.

9. Conflict of Interest Statement

With respect to this study, we declare that there is no potential conflict of interest in the publication of this article.

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