
Title	Core 3 Research Programme: Singapore coding scheme manual (Physical education)
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Core 3 Research Programme

Singapore Coding Scheme Manual (Physical Education)

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Table 1. Overall Structure.

INTRODUCTION

The Singapore Coding Scheme Manual for Physical Education (SCSMPE) was designed as part of the Core Research Programme of the Centre for Research in Pedagogy and Practice, Singapore. SCSMPE provides a broad heuristic guide for using the coding instrument that includes a range of indicators embedded in an Excel file to facilitate coding of each lesson in 5-minute intervals, as well as of larger events such as games. This allows for a temporal examination of classroom practices from the start to the end of a lesson, and across the unit of lessons. A binary coding scheme is used for practically all the phasal level codes (most with multiple subscales and indicators) to record whether or not an instructional event happened during the 5-minute phase (No=0, Yes=1, with the default set at 0). A Likert Scale (typically 0-3) applies for a small number of scales in order to capture more detail about the instructional event. Within scales, subscales and indicators are, in nearly all cases, *not* mutually exclusive thus, permitting multiple responses per scale or subscale.

Broadly, SCSMPE is divided into Phasal and Lesson codes. Importantly, the coding of lessons signifies a move from clearly observable behaviours and the social organization of the classroom and students, towards more subjective, or inferential, practices of teachers and students. In other words, the codes are designed to facilitate coding from simple to complex patterns of classroom interactions and instructional practices.

For ease of documentation and specifically, to cater to the coding of English Language, the SCSMEL is divided into two parts (Table 1: Overall Structure):

1. Phasal Codes
2. Lesson Codes

PHASAL

FRAMING

Please do not insert any spaces between letters or numbers.

- **Teacher Type (HOD, LT, ST, SH/LH, T etc.)**
- **Teaching Experience (Years)**
- **Stream**
Input the code for the stream of the class, SD = Standard, EX = Express, NA = Normal Academic, NT = Normal Technical
- **Focus**
Input the topic/theme of the lesson
- **Number of Intervals**
- **Start Time**
This time refers to the video timing. Code the time when the teacher gives the salutation/greeting. If there is no formal salutation/greeting that takes place, look out for other cue/s (e.g., clapping, “Class, are you ready?”) that signal/s the start of the lesson.

1 STUDENT LEARNING ACTIVITIES

The purpose of this scale is to determine in a very general way the common activity types that students are engaged in during the lesson.

In #1, we want to focus mostly on the specific learning activities that students are asked or instructed by the teacher to engage in over the course of the lesson at the whole class level. It is important to keep in mind that we are coding student behavior based on teacher’s instructions.

We code absent or present (0/1) for each phase. Multiple codes per phase are permissible.

1.1 Listening to/viewing the teacher's exposition/performance, whole class demonstration; students take notes of what teacher says/writes on whiteboard/presents in PPT (does not include instances when T engages in organisation talk)

Listening to the teacher's exposition: Students listen to teacher as he/she delivers curriculum-related information or whole class feedback.

Whole class demonstration: Students watch as teacher demonstrates how to work with a teaching or learning aid, for example, protractors, dictionary, thesaurus, musical/drawing instrument.

Students take notes of what teacher says/writes on whiteboard/presents in PPT; Students take notes of what teacher has said or written on the whiteboard or presented on powerpoint slides.

P5 Example: S5T5 L1 Int 1 (Floorball)

Teacher is instructing students on the objectives of the first game that they are playing today.

T: In your three, in this game's objective, is to make five good consecutive passes. And we're going to do warm defender. Do you know what is a warm defender? No interception, you can't intercept.

S3 Example: S50T7 L1 Int 1 (Touch Rugby)

Teacher explains to the students the aims of the first activity that they are doing today as she tries to introduce the rules of touch rugby to the students.

T: During your three rounds warm up, in your pairs, you will have a ball. When I have the ball, he can run besides me but when I want to pass to him, I have to either...what are the two options? So that I can be passing backwards...either I run forwards or that he runs backwards. Just like how in the rugby game itself.

1.2 Listening/asking/answering questions (content or curriculum related); IRE; S to S questions/answers (directed/redirected by T)

Conventionally, this has been understood to be an iterative process with multiple, rapid fire IRE sequences. Here we will code predominantly IRE or IR-IR-IRE. For example:

In a lesson on Reading Comprehension, students answer the teacher's questions posed to check students' understanding of the passage read; or to test their prior knowledge of the lesson content. Typically, students receive feedback from the teacher.

Possible indicator:

One to one talk between teacher and student in a whole class setting and/or teacher ask question in a whole class setting and students give short answer.

N.B. Students' response need not be verbal, can be in written form (texts, diagrams, graphs and etc.) on the whiteboard, on a piece of paper and etc.

P5 Example: 12 L2 Int 7 (Badminton)

T: Ok, let's talk about strategies. What did we apply? What did we do? This group over here first. What did you do?

S: We spread out and...when we spread out, we can hit it and then the person can go into the middle and...

T: Ok, spreading out and then going into the middle. If everyone spreads out, then the middle is empty. So who goes into the middle?

S: The person nearest to it.

S3 Example: S50T7 L1 Int 4 & 5 (Touch Rugby)

T: Why do you think we don't pass straight?

S: To spin the ball.

T: Apart from spinning the ball?

S: Forward pass.

T: I could do a forward pass even from the left or the right. What is the difference if I do from the side?

S: Not enough strength.

T: Not enough strength. Because this is my only range but if I do from the side, I could have a much better range of motion so the ball can actually travel further and faster.

1.3 Listening /participating (commenting, asking questions) in whole class discussion and dialogue (including IDRE)

Teacher initiates an extended whole class T_S_S discussion of idea, concept, story using a range of strategies to open up discussion (e.g., waiting time, holding back on evaluation, more than one open-ended follow up questions, extension or redirection moves). Can include IDRE exchanges in which teacher encourages students to discuss possible responses together in pairs before giving a considered response, followed by

teacher evaluation (Mercer, Dawes, Wegerif & Sams, 2004). Including substantive and open ended questions and brainstorming. Discussion is free flowing (typically, involving more than two students), and at best, can develop into genuine dialogue in which the teacher encourages students to make connections between ideas or responses and directs conversation so that it maintains momentum or moves forward and becomes cumulative. The teacher may request for and record student contributions verbally or on the whiteboard. In a certain sense, this is a less explicit evaluation of student work through comments, ideas and redirection provided by the teacher. Similarly, the student may also note student contributions verbally or on the whiteboard.

IDRE may include:

- Invite ideas: invite opinions/beliefs/ideas
- Build on ideas: build or clarify other's contributions
- Invite elaboration or reasoning: ask for explanation or justification of one's own or another's view, invite prediction; ask for elaboration/clarification
- Make reasoning explicit: explain or justify one's own or another's contribution, speculate and predict on the basis of one's own or another's contribution
- Connect: refer back; make learning trajectory explicit; link learning to wider contexts; invite inquiry beyond the lesson
- Positioning and coordinating: synthesize ideas; compare/evaluate alternative views; propose resolution; acknowledge shift in position; challenge viewpoint; state position
- Reflect on dialogue or activity: talk about talk; reflect on learning process/purpose/value; invite reflection about process/purpose/ value of learning
- Guide direction of dialogue or activity: encourage S-S dialogue; propose action or inquiry; introduce authoritative perspective; provide feedback; focus on activity aspects; allow thinking time
- Students building on and responding to one another's answer, and answers are generally long.

Note: IRE may happens first then shift to IDRE. Code when it starts e.g. IRE in 1st interval and IDRE in 2nd interval.

No examples were observed.

Possible example for P5 and S3: (Hypothetical)

Teacher cannot engage class in exercise due to difficult circumstances so he/she instead creates a discussion about sports/strategies/tactics/exercise habits of his/her students.

1.4 Using reference materials (e.g. textbooks, teacher-prepared notes, online sources) to actively search for new information

Students refer to various sources to look up for information as instructed by the teacher. Includes online searches for new information. For example, the teacher tells the students to use their handphone to look up for more information about what MCYS does. Students start googling for MCYS.

No examples were observed.

Possible example for P5 and S3: (Hypothetical)

Teacher is trying to introduce concepts and strategies related to the games that they are playing and tell the students to search for tactics online.

1.5 Reading, written text, class notes/curriculum materials (aloud/silently)

Does not include instances when we observe some students reading or viewing written or visual text, class notes/curriculum materials silently on their own accord.

No examples were observed.

Possible example for P5 and S3: (Hypothetical)

Teacher passes out notes on the game that they are playing (i.e. Netball) that detail the rules and positions of players, as the Teacher has temporarily lost her ability to speak.

1.6 Focused viewing of visual text based on teacher's instruction (e.g. political cartoon, portrait and etc.)

Students study a visual text closely.

P5 Example: S10T4 L4 Int 1 & 2 (Basketball)

Teacher uses a small whiteboard to write down acronyms to help students to remember the objectives of his lesson. He wrote down B.E.E.F and asked the students what they stood for. They were answered that B was Bend your knees and elbow, E was Elevate, E was Extend, and F was Follow Through.

S3 Example: S51T9 L5 Int 1, 2 & 3 (Netball)

Teacher uses a whiteboard to help student visualize the positions and the range of movement allowed for each position in Netball.

1.7 Reproducing text (verbal/written) or performance/action based on teacher's instructions

Students copied verbatim what teacher has written/drawn/displayed on the whiteboard/powerpoint slides; students highlight text based on teacher's instruction. In the case of performance, the T might be giving instruction or demonstrate an activity or performance, followed by instruction to the students to repeat that activity/performance.

T might introduce something new and students imitate what the teacher said (low level cognitive) and non-improvisation.

Note: May code 1.14 as well.

P5 Example: S11T5 L4 Int 2 & 3 (Softball)

Students reproduce the swing technique and stance shown to them by their teacher during Softball lesson.

S3 Example: S58T8 L1 Int 1 (Basketball)

Teacher is introducing Basketball to the students and has the students practice their dribbling by saying "Follow me" while dribbling a basketball and alternating between standing and bent over.

1.8 Watching video/listening to audio recording

Students, as a whole class, watch a curriculum-related video or listen to an audio that the teacher is playing. This does not include instances when we observe one or a group of students watching a video to gather more information.

P5 Example: S7T5 L4 Int 5 (Basketball)

Teacher asks the whole class to sit down and watch a short video on Basketball.

S3 Example: S50T7 L2 Int 1 & 2 (Touch Rugby)

Teacher has the whole class sit down and watch a short video on Touch Rugby.

1.9 Giving/listening to student presentations (guided/exploratory/prepared)

Students report back to class on individual or group work, perform a demonstration, drama or role play, or do a presentation to the class. Can include a demonstration at the whiteboard, show and tell; presentation of students' writing or text. Can also include OHT presentations; formal presentations; presentation of results from experiments. May include some feedback or answer checking. Always to the whole class. Also includes the teacher inviting a student to come to the whiteboard and work out a solution, such as parsing a sentence, in front of the class with/without promptings from the teacher or other students in the class.

P5 Example: S11T5 L4 Int 2 & 3 (Softball)

Students demonstrate the correct stance and technique when swinging the bat in Softball.

S3 Example: S58T8 L1 Int 3, 4, 5 & 6 (Basketball)

Students help the teacher demonstrate the activity he wants the class to execute.

1.10 Experimental/Exploratory activities

Students are engaged in an activity to uncover or enhance their understanding of abstract concepts or results from concrete manipulatives and (hands-on) experiences. Alternatively, in subjects such as EL, VA, MU, PE, students are engaged in **hands-on activities** that allow them to exercise a **degree of creativity on their own**, with **minimal rules, guidelines or parameters** within which they have to work on. The teacher must explain or discuss what the students have done in relation to some new rules or understanding. Teacher may provide guidance as students explore, investigate and find answers on their own.

Put in another way, if the teacher explains a concept and gets students to do something, this counts as 'practice'. But if the teacher gets students to do something, that leads to teacher explaining/discussing the concept, this counts as 'exploratory'.

Note: Code for 10.3 Game Setting when this is coded.

P5 Example: S5T5 L1 Int 8 & 9 (Floorball)

(Feedback and discussion took place in interval 10)

Teacher has the students break up in groups of three to complete five consecutive passes with one of them playing as a hot defender (defender can intercept the ball). After playing the game, the teacher gives some feedback and discusses with the students how they could have kept possession better.

T: So, now you can dribble, now you can pass, now you can receive. The next lesson, you are going to learn how to maintain possession. So how do you maintain possession? Just give me one idea.

S: Keep the ball close to you.

T: How do you maintain possession?

S: Dribble.

T: Do you stand behind the defender?

S: No.

T: So what should you do?

S: Cut into open space.

T: Very good. Move to open space. So the next lesson, you are going to learn how to maintain possession by moving into open space.

S3 Example: S58T8 L1 Int 6, 7 & 8 (Basketball)

After spending the majority of the lesson on some skills training for Basketball, the teacher then has the students play a game of Basketball. He then gathers the students after the game to discuss some of the concepts that he wants them to learn.

T: So, remember, after you pass, what must you do?

S: Run.

T: Run. Then I also must run into? Space.

1.11 Self-Assessment without Rubrics (inc. exit passes, traffic light, 3-2-1, reflection journal etc.)

Student evaluates his/her own work using strategies such as exit pass, traffic light, 3-2-1, etc. If teachers use checklists, consider what is the focus of the checklist - if the checklist is largely procedural (e.g. have you labeled your axis, checked your grammar etc), then this should be coded as Checking #1.18. If the focus of the checklist is more conceptual or metacognitive, this can be considered for #1.11.

This can be through a set of written questions such as “how do you feel when you are doing the task” or “what have you learned”. If self-assessment involves reflection, code for Metacognitive Knowledge.

P5 Example: S2T5 L1 Int 5 & 6 (Tchoukball)

Teacher assembles the whole class after playing a game of Tchoukball.

T: Ok, before I tell you my observations, I want you all to tell me your observations.

What has gone well so far for you all?

S: Catching.

T: Ok, maybe for his team.

S: Switching direction.

T: What needs to be improved?

S: They need to pass to all of the members. When I was playing, most of them didn't even notice me.

S3 Example: S51T9 L7 Int 2 & 3 (Netball)

Teacher has students fill out a test on what they have learnt on Netball at the end of the unit. The teacher then verbally goes through the answers of the test, with the students marking their own answers.

1.12 Self-Assessment with Rubrics

Student evaluates his/her own work based on a set of criteria or rubrics (typically provided by the teacher) For example:

Students evaluate their Narratives on the basis of a self-evaluative checklist which outlines various criteria in four broad areas: Focus, Elaboration, Content and Organisation.

Peer/Self Assessment using Rubrics/Criteria: Code for peer- or self-assessment using rubrics/criteria if the teacher provides rubrics/criteria for students to use.

No examples were observed.

Possible example for P5 and S3: (Hypothetical)

Teacher has the students monitor and assess their physical fitness status and activity patterns using established fitness assessment tools.

1.13 Peer-Assessment without Rubrics

Students evaluate and provide feedback on other students' work using strategies.

Exclude student responses/comments on another student's work based on teacher elicitation in whole class context.

No examples were observed.

Possible example for P5 and S3: (Hypothetical)

Teacher pairs up students as one plays while the other observes. The one observing will then give feedback and evaluate the other students' work, based on what they have seen.

1.14 Peer-Assessment with Rubrics

Students evaluate and provide feedback on other students' work based on a set of criteria or rubrics (typically provided by the teacher). If criteria or rubrics are not present, do not code for peer assessment. Exclude student responses/comments on another student's work based on teacher elicitation in whole class context.

No examples were observed.

Possible example for P5 and S3: (Hypothetical)

Teacher has students monitor or record their fitness routine. The students in the class then evaluate and provide feedback on each other's routine using a rubrics provided by the teacher.

1.15 Critiquing/Peer-editing

Teacher presents a student's work on the board, or students are asked to present their responses on the board. and the rest of the class will provide (constructive) feedback about them. This process allows students (who are giving feedback) to practice reading and understanding, compare the different responses presented with their own to evaluate how one response is "better" than the other. It also allows students (who are

receiving feedback) to identify the gaps in their responses and to improve their own thinking process.

P5 Example: S11T5 L4 Int 3 (Softball)

Student is one of five students practicing swinging the bat in front of the class. Her classmates give her feedback that she should bend her knees.

No examples observed for S3.

Possible example for S3: (Hypothetical)

A student approaches the teacher with question about his/her form when dribbling. Teacher asks the whole class to provide feedback on the student's form to test their understanding.

1.16 Working/talking with other student/s on an activity/walking around the classroom (explicit teacher instruction or student-initiated/Gallery walk)

Students walk around the classroom talking to other students or groups. Students do a gallery walk when they view other students' work as they walk throughout the classroom, moving from one station to another. Code for this only in the presence of an explicit teacher instruction.

No examples were observed.

Possible example for P5 and S3: (Hypothetical)

Teacher instructs students to walk around the hall/field/court to talk to the students playing the game.

1.17 Practice (includes working on workbook, notebook, worksheet, computer, physical practice or musical instruments)

Students engage in repeated exercise, or when the T provides a demonstration of an action or activity, followed by asking students to perform that action or activity (includes whole class rote memorisation/drill) in order to acquire skill or proficiency. Practice can include variation or improvisation of particular actions or activity (while reproduction does not involve variation or improvisation).

For example:

In a whole class context, students read aloud from the PPT slides: I am, He is, she is, they are, we are. Or, Students do a worksheet on Prepositions involving fill in the blanks, multiple choice questions etc.

When games (e.g. in Maths) are used for practice, code these as practice.

Note: May code 1.7 as well.

Note: Code for 10.2 Drill Setting when this is coded.

P5 Example: S12T5 L1 Int 4, 5, 6 & 7 (Badminton)

Students are instructed by the teacher to practice juggling the shuttlecock with their rackets on their own.

S3 Example: S58T8 L1 Int 1 & 2 (Basketball)

Students are instructed to practice their dribbling as a class, following the teacher's instruction.

1.18 Checking/Reviewing/Revising (exemplary/previously completed work) - includes proofreading (whole class)

Students do corrections as teacher goes through the answers. Teacher/students diagnose and identify learning gaps and misconceptions. Also includes instances where the teacher shows a sample of a student's work she has marked to highlight good practices or common mistakes made. If the teacher uses checklists, code for #1.18 if the checklist is largely procedural in nature.

P5 example: S11T5 L2 Int 4 (Softball)

After the exercise ended, the teacher gathered the students in a group and attempted to clear up some confusion.

T: So throw a bit slow lah? Important to throw fast right? Today, I only show you throwing in an anti-clockwise direction, but in an actual softball game, it depends on how fast the runner runs. Let's say, the runner starts from the home base and runs to the third base. I will not throw the ball to the second base but to the third base so that my friend can catch the ball and tag the runner to out the runner. Understand? Anyone confused with the game?

S3 example: S58T8 L6 Int 7, 8, 9, 10 & 11 (Basketball)

Teacher provides correction to students as they are playing Basketball.

1.19 Sharing reflection

Students share with at least one other student their reflection on the lesson/unit.

N.B. includes students stating what they have learnt for the unit observed

P5 Example: S12T5 L2 Int 6 (Badminton)

T: Ok, let's talk about strategies. What did we apply? What did we do? This group over here first. What did you do?

S: We spread out and...when we spread out, we can hit it and then the person can go into the middle and...

T: Ok, spreading out and then going into the middle. If everyone spreads out, then the middle is empty. So who goes into the middle?

S: The person nearest to it.

No examples observed for S3.

Possible example for S3: (Hypothetical)

Teacher asks the student at the end of the unit what he/she learnt during their unit on Softball. Student replied with a summary of the rules of Softball and the general tactics to playing Softball.

1.20 Non-learning/non-curriculum oriented activities

Students engage in activity that is not directly related to the curriculum. For example, students are asked by the teacher, who noticed that they are feeling tired/restless, to stand up and do some stretching exercises (this does not apply to PE as stretching exercises are considered part of the curriculum).

P5 Example: (Hypothetical)

Students going on water break.

S3 Example: (Hypothetical)

Students returning equipment to the equipment room.

1.21 Individual (seat) work

Students are working individually (at their seats) with teacher present and available for consultation. For example, working individually on worksheets, computers, etc.

P5 Example: S12T5 L1 Int 4, 5, 6 & 7 (Badminton)

Students are instructed by the teacher to practice juggling the shuttlecock with their rackets on their own.

S3 Example: S58T8 L6 Int 1 (Basketball)

Students practice shooting the basketball on their own.

1.22 Pair/group work

Pair or group work activities begin when the social configuration of the classroom changes. For example, either students shift their seats or move to another location in a classroom. Similarly, pair or group work activities end when students are instructed by the teacher to move back to their original positions. In some circumstances students are already in their groups physically (e.g., four desks are placed together in a room). Under these circumstances the activity begins and ends with explicit instructions from the teacher (e.g., “Class now begin work!” or “Time is up!”).

P5 Example: S5T5 L1 Int 2 (Floorball)

Students practice passing the ball to each other in groups of three, with one student playing as the warm defender (not allowed to intercept the ball).

S3 Example: S58T8 L6 Int 4 (Basketball)

Students practice passing the ball to each other in groups of four, with one student playing as the monkey.

2 CLASSROOM TALK: QUESTION AND RESPONSE TYPE

For all questioning, only code for learning related questions. Do not code for e.g. organisational talk, e.g. when a student asks a teacher about the task and teacher's instructions. When curriculum related questions and responses occur, make sure to code for knowledge focus; however, it is not necessary to code for classroom talk in some situations when curriculum related questions and responses occur. For example, a feedback question by teacher might solicit a short student response - there must be knowledge focus but not necessarily classroom talk.

2.1 Whole class – includes addressing individual student in a whole class setting

2.1.1 Teacher Closed Question

Closed questions only have a single right answer. E.g. What is the capital of Egypt? What is 2 plus 2? What is a Noun? Where is the Verb in this sentence?

If the T asks a question that is about something the S has done, in other words, asking the S to report on their action or activity, the question is a closed question (because the action has been completed and there is only one answer).

T: What have you done with the toothpick in the artwork?

S: To make dots [because the S has already used the toothpick to make dots]

Generally, closed questions:

- Impose a binary (Yes/No answer) on the respondent
- Require the respondent to choose from a set of multiple-choice options
- Can be answered by a limited set of possible answers
- Allow the questioner to get what s/he expected
- Limit responses to what the questioner believes to be true
- Directly or indirectly influence the respondent to give a certain response
- Often stops the conversation
- Frequently start with what, when, who, which, where
- Typically, yield short answers, and if detailed, are generally of a factual/definitional nature
- Yield answers that can be analysed statistically (e.g. survey data)

- Frequently elicit undisputed responses of a factual/procedural nature e.g. geographical features, scientific definitions, widely-accepted truths, historical facts, mathematics formulae etc

P5 Example: S2T5 L1 Int 2 (Tchoukball)

T: First up, for Tchoukball, we've got two nets. What are the correct names for it?

S: Frames.

T: Tchoukball frames or? Starts with R.

S: Rebounder.

S3 Example: S58T8 Lesson 1 Int 8 (Basketball)

T: So, remember, after you pass, what must you do?

S: Run.

T: Run into what?

S: Space.

2.1.2 Teacher Open Question

Open questions are questions that do not have a single right answer but allow students to interpret, explore, explain alternative answers or viewpoints in “exploratory talk” (Barnes). For example: “What do you mean?” “Why do you think that?” “Good: Have you considered X instead?” “If that is the case, how come so and so happens?”, “I don't get that. What do you mean?” “Is X an example of something of what you are saying?” “If you changed X in your statement (where X is one element in the statement) would you get the same result?” “Is X like Z?” (where Z is an analogy). “Can you explain that in more detail?”¹

Generally, open-ended questions:

- Provide scope to the respondent to provide information which seems appropriate to him/her

¹ Note Galton (1999) classified teacher questions in terms of how teachers reacted to student responses (accepting alternative answers) rather than to the epistemic nature of the question (open, closed). See Hardman in Mercer and Hodgkinson, 136. See also Nystrand on “uptake questions” that incorporate student responses into follow up question (Hardman 142-143). See also Wells in Mercer and Hodgkinson, 173, on the importance of open questions to exploratory dialogue, and Sohmer, Michaels and Resnick (2009) on “accountable talk”.

- Allow a free-form answer
- Have the potential to yield new, unknown or even surprising responses
- Enable the questioner to find out more than s/he anticipates
- Are often followed by more deep, probing questions (open-ended)
- Permit rich, qualitative responses and deep insights to emerge
- Are characterised by word choices that permit the questioner to 'discover' things
- Are often followed by further open-ended questions
- Often reveal the mental models, problem-solving strategies, design solutions, emotions (love, hope, fear etc) of the respondent
- Generate what is important to the respondent e.g. *What did you find out? How do you know? What else were you expecting? What has worked well for you? How satisfied are you with this process?*

Note:

1. It is important to gauge the overall classroom context.
2. While the classroom talk preceding and following the question, provides a good indication of the nature of the question (open/closed), it is not advisable to base the coding entirely on the nature of the preceding or subsequent talk.

P5 Example: S12T5 L2 Int 7 (Badminton)

T: Ok, let's talk about strategies. What did we apply? What did we do? This group over here first. What did you do?

S: We spread out and...when we spread out, we can hit it and then the person can go into the middle and...

S3 Example: S50T7 L1 Int 4 & 5 (Touch Rugby)

T: Why do you think we don't pass straight?

S: To spin the ball.

T: Apart from spinning the ball?

S: Forward pass.

2.1.3 Student Short Response to Teacher

Short response: One-word answers, incomplete sentences, a number/alphabet/symbol to represent a word or idea, a phrase, a figurative/idiomatic expression.

P5 Example: S2T5 L1 Int 2 (Tchoukball)

T: First up, for Tchoukball, we've got two nets. What are the correct names for it?

S: Frames.

T: Tchoukball frames or? Starts with R.

S: Rebounder.

S3 Example: S50T7 L1 Int 4 & 5 (Touch Rugby)

T: Apart from spinning the ball?

S: Forward pass.

2.1.4 Student Medium Response to Teacher

Medium response: One or two sentences, a clause to represent a complete idea.

P5 Example: S12T5 L2 Int 6 (Badminton)

T: Ok, let's talk about strategies. What did we apply? What did we do? This group over here first. What did you do?

S: We spread out and...when we spread out, we can hit it and then the person can go into the middle and...

S3 Example: S50T7 L1 Int 14 (Touch Rugby)

T: Why do we want to maximize our playing area?

S: So that the defender has to run more.

2.1.5 Student Extended Response to Teacher

Extended response: Three sentences or more, a paragraph, extension of an idea or theme, elaboration/description. The length of text is not applicable to visual text as well as graphical text.

P5 Example: S11T5 L2 Int 4 (Softball)

T: How about for your group?

S: So, Student A was the runner, then I was standing over there. So then, I was throwing the ball but I threw it too slow. I couldn't throw too fast because the ball would just fly away.

No examples observed for S3.

Possible example for S3: Student gives an explanation of the rules of Netball after the teacher asks.

2.1.6 Student Closed Question

[as above]

P5 Example: S12T5 L1 Int 3 (Badminton)

S: What happens if we drop the shuttlecock?

T: Okay, dropping the shuttlecock, restart from zero again, of course.

S3 Example: S51T9 L6 Int 6 (Netball)

S: What happens if one side throws over one-third of the court? (in Netball, you cannot pass the ball further than one-third of the court at one time)

T: Ok, very good question. Let's say in the middle here, there is a one-third pass all the way to here, the ball comes back to where it is here. If it was the Green who committed the mistake, pass the ball to the Pink to do it.

2.1.7 Student Open Question

[as above]

P5 Example: S2T5 L1 Int 14 (Tchoukball)

S: If I step past the line when I shoot, is it counted?

T: If it is interfering with the game, then it is not counted. Because that means that as the ball comes in...if the ball flies far away and you step in, then the referee will just let it go because you are not interfering with the game. It all depends on the situation and what the referee sees at the moment. It is difficult for me to give you a direct answer.

No examples observed for S3.

Possible example for S3: (Hypothetical)

Student asks the teacher: "Teacher, how can I maximize the chances of me scoring points in a Softball game?" Teacher then explains several strategies or techniques the student can use to play the game.

2.1.8 Teacher Short Response

[as above]

P5 Example: S12T5 L1 Int 1 (Badminton)

S: When are the inter-class games?

T: End-of-the-term.

S3 Example: S57T11 L1 Int 4

S: Whose ball is it?

T: Yours.

2.1.9 Teacher Medium Response

[as above]

P5 Example: S2T5 L1 Int 13 (Tchoukball)

S: Is there any prize for the first winner, second winner, third winner?

T: The prize is your recognition as the winner.

S3 Example: S51T9 L1 Int 1 (Netball)

Student: Can you change the other marker?

Teacher: No, you can only change your own group's colour.

2.1.10 Teacher Extended Response

[as above]

P5 Example: S2T5 L1 Int 14 (Tchoukball)

S: If I step past the line when I shoot, is it counted?

T: If it is interfering with the game, then it is not counted. Because that means that as the ball comes in...if the ball flies far away and you step in, then the referee will just let it go because you are not interfering with the game. It all depends on the situation and what the referee sees at the moment. It is difficult for me to give you a direct answer.

S3 Example: S51T9 L6 Int 6 (Netball)

S: What happens if one side throws over one-third of the court? (in Netball, you cannot pass the ball further than one-third of the court at one time)

T: Ok, very good question. Let's say in the middle here, there is a one-third pass all the way to here, the ball comes back to where it is here. If it was the Green who committed the mistake, pass the ball to the Pink to do it.

2.2 Individual/Group

2.2.1 Teacher Closed Question

[as above]

P5 Example: S2T5 L1 Int 11 (Tchoukball)

T: Student A, when you took the shot, did you notice a lot of people around you?

S: Yah.

S3 Example: S51T9 L7 Int 5 (Netball)

T: Your first pass must be...?

S: Center.

2.2.2 Teacher Open Question

[as above]

P5 Example: S2T5 L1 Int 11 (Tchoukball)

T: So what could you have done?

S: Turned direction.

S3 Example: S60T11 L5 Int 8 (Softball)

T: Student A, that was a good shot. How did you feel about the swing?

S: Bad.

T: Why? Why bad?

S: I feel like it didn't go high. Because I realized that my follow through would mess up everything because sometimes I would stop here.

T: So you are used to stopping halfway?

S: Yeah, I think so. So just now I tried following through but I don't know whether it is correct or not.

2.2.3 Student Short Response to Teacher

[as above]

P5 Example: S2T5 L1 Int 11 (Tchoukball)

T: Student A, when you took the shot, did you notice a lot of people around you?

S: Yah.

S3 Example: S51T9 L7 Int 5 (Netball)

T: Your first pass must be...?

S: Center.

2.2.4 Student Medium Response to Teacher

[as above]

P5 Example: S12T5 L1 Int 5 (Badminton)

T: Student A, which is better? Juggling the shuttlecock at this height or at this height?

S: I think lower better.

T: Ok, try.

S3 Example: S51T9 L6 Int 9 (Netball)

T: Why don't you all shoot the ball? Why are you passing to each other?

S: Just now, she shot the ball but she caught it.

2.2.5 Student Extended Response to Teacher

[as above]

No examples were observed for P5.

Possible example for P5: (Hypothetical)

T asks Student A to talk about what he learnt during the Badminton game he had today. Student A lists down three or more things that he has learnt during the lessons today and gives some feedback on his own performance.

S3 Example: S60T11 L5 Int 8 (Softball)

T: Student A, that was a good shot. How did you feel about the swing?

S: Bad.

T: Why? Why bad?

S: I feel like it didn't go high. Because I realized that my follow through would mess up everything because sometimes I would stop here.

T: So you are used to stopping halfway?

S: Yeah, I think so. So just now I tried following through but I don't know whether it is correct or not.

2.2.6 Student Closed Question

[as above]

P5 Example: S10T4 L4 Int 7 (Basketball)

S: So when I run, she will pass to me?

T: Yes.

S3 Example: S50T7 L3 Int 12 (Touch Rugby)

S: Teacher, which is the line where we have to pass back?

T: No, every time back 5 steps only.

2.2.7 Student Open Question

[as above]

P5 Example: S3T5 L2 Int 7 (Floorball)

S: If I throw the ball and the person who received the ball touched it but didn't catch the ball, and the monkey picks up the ball instead, who becomes the new monkey?

T: The person who caused the mistake to happen. If the mistake was in the throwing that causes the monkey to be able to catch...

S: The person touch but the monkey catch.

T: Then it is his fault.

No examples observed for S3.

Possible example for S3: (Hypothetical)

Student asks the teacher a question while he is practicing his passing with another student: “Teacher, how come we need to practice this? It is so boring.” Teacher then explains the importance of practice and of learning the fundamentals in order learn and excel in the game.

2.2.8 Teacher Short Response

[as above]

P5 Example: S10T4 L4 Int 7 (Basketball)

S: So when I run, she will pass to me?

T: Yes.

S3 Example: S55T11 L2 Int 3 (Volleyball)

S: Teacher, I thought that we are supposed to use this area to hit the ball?

T: Hit here.

2.2.9 Teacher Medium Response

[as above]

P5 Example: S3T5 L2 Int 7 (Floorball)

S: Can the guy with the ball just move and roll the ball away?

T: No, the guy with the ball cannot move but he can roll in any way he wants.

S3 Example: S50T7 L3 Int 12 (Touch Rugby)

S: Teacher, which is the line where we have to pass back?

T: No, every time back 5 steps only.

2.2.10 Teacher Extended Response

[as above]

P5 Example: S3T5 L2 Int 7 (Floorball)

S: If I throw the ball and the person who received the ball touched it but didn't catch the ball, and the monkey picks up the ball instead, who becomes the new monkey?

T: The person who caused the mistake to happen. If the mistake was in the throwing that causes the monkey to be able to catch...

S3 Example: S57T11 L1 Int 5

S: Teacher, do you know where WA is? (In Netball)

T: WA? If you are attacking, you stand in this half of the court, your attacking half. That's it. You cannot go into the semi-circle, you cannot go backwards. Center and this part.

3 VISIBLE LEARNING

Code absent or present (0/1) for each phase. Multiple codes are permissible for each phase.

3.1 Teacher communicates learning goals and outcomes

Teacher writes the lesson objective/s on the white board or communicates the objectives verbally.

Example: Teacher states that the communication framework students will learn in the lesson will equip them with healthy social interaction skills

(C3 PP S52T6) T communicates the learning objectives verbally:

These first two weeks we are going to focus on circle properties then we are going to do Revision Booklet...The last chapter, Geometrical Properties of Circles, has two parts – one is the Symmetrical Properties and the other one is the Angle Property of Circles. We are only going to cover the Symmetrical Properties. Hopefully, we can cover all four today. If not, we will just cover two. I'm going to go through the properties first before we go into the practices.

P5 Example: S3T5 L2 Int 2 (Floorball)

T: Ok, remember the focus of today is to move into open space. Attacker move away from the defender, you can move to the side. Don't stand behind the opponent, don't stand behind the defender.

S3 Example: S50T7 L1 Int 1 (Touch Rugby)

T: Ok, I'll teach you how to pass, don't worry, so you can just pass however you think you want to pass because today, one of our objectives, after our three rounds warm-up, we will still go back to our molecules tag so that you can look at where you are running to. Then later, we will learn how to pass the rugby ball today.

3.2 Teacher tells students what they have learnt previously

P5 Example: S2T5 L1 Int 2 (Tchoukball)

T: In Term 2, I introduced you to Tchoukball, am I right? But today, we are going to start fresh. We take it that it is lesson one and we are going to recap the rules and go on from here.

S3 Example: S51T7 L5 Int 2 (Netball)

T (using a whiteboard with markers for the positions of the players in Netball): So if I am shooting over here, this person naturally is the GS. You all already learned GS. GS will be here shooting. There will be another person over here shooting. She is the GA. So GS and GA, these two are your shooters.

3.3 Teacher checks students' pre-requisite knowledge, concepts, skills and/or previous learning

P5 Example: S5T5 L1 Int 1 (Floorball)

T: Ok, a quick recap, last lesson, what did we do?

S: How to gain control of the ball.

T: How did we gain control of the ball?

S: Dribble.

T: What makes a good dribble?

S: Keep the ball close to you.

S3 Example: S50T7 L1 Int 1 (Touch Rugby)

T: Later, during your three rounds warm up, a pair will be having a ball. When I have the ball, he can run beside me, but if I want to pass to him, I have to either...what are the two options? So that I can be passing backwards? I run forwards or that he...?

S: Run backwards.

T: Just like how in a rugby game itself.

3.4 Teacher relates concept/topic to everyday life

P5 Example: S5T5 L1 Int 1 (Floorball)

T: What makes a good dribble?

S: Keep the ball close to you.

T: Now I'm not sure who watched Brazil vs Mexico game. You watched Neymar or not? The way he dribble, it is like the ball sticks to his leg. A good dribble makes a lot of difference. To make a good dribbling, the ball must be close to your sticks.

S3 Example: S58T8 L6 Int 11 (Basketball)

T: In the real Basketball, how many seconds do you have to shoot?

S: 24 seconds.

T: You know sometimes you hear basketball games, they play music? De de de de de de de. That music starts on the 20 seconds so when it ends, people must shoot. This is a signal to the player.

3.5 Teacher connects the topic of discussion with the topic/theme/activity of the day's lesson

P5 Example: S4T5 L4 Int 6 (Tchoukball)

T has a group of five boys demonstrate how to score in Tchoukball. The boys try different ways while the teacher encourages them to try standing in different areas. After a few attempts, he then instructs one of the boys to stand at an angle to the net when shooting the ball and then tells the class that this is what he intends them to practice amongst themselves, as this way of shooting offers the attacker the best chance of scoring.

S3 Example: S51T9 L1 Int 5 (Netball)

Teacher demonstrates the activity she wants the students to perform with four other girls in her Netball class. The activity involves passing the ball to the sides of the students to make them move in that direction and reach for the ball. The aim of the

activity is to teach the students to pass into space, instead of directly to their teammates. With the differing levels of physical capabilities of each girl, the teacher explains what she expects each students to do to push their classmates. She also explains that as this would involve Netball rules, they must plant their feet after catching the ball and cannot move.

3.6 Teacher summarises key points contributed by students during the lesson/activity

P5 Example: S5T5 L1 Int 8 & 9 (Floorball)

T: So, now you can dribble, now you can pass, now you can receive. The next lesson, you are going to learn how to maintain possession. So how do you maintain possession?

Just give me one idea.

S: Keep the ball close to you.

T: How do you maintain possession?

S: Dribble.

T: Do you stand behind the defender?

S: No.

T: So what should you do?

S: Cut into open space.

T: Very good. Move to open space. So the next lesson, you are going to learn how to maintain possession by moving into open space.

S3 Example: S50T7 L3 Int 8 (Touch Rugby)

T: Just now, actually some of you managed to get your two versus one was not too bad. The draw and pass was good but what did is one problem that you see that fails your attack every time?

S: Your friend don't know how to backpedal.

T: There is one more critical problem here.

S: Don't know how to pass.

T: Don't know how to pass. Give me the ball, because every time when you see the defender come close to you, what do you do? When the defender come close to you, instead of doing a proper spin pass, instead of thinking, like I said, you should be about one arm away so that you can do your passing. But when the person is so close to you,

you felt pressurized, and then the next thing you do, you just chuck the ball on the floor. The friend can't catch the ball which is what happens many times as you can see from the attack itself. So these two things, bear in mind: always backpedal and not to chuck the ball on the floor. So when you see the defender is approaching, about one arm away, you got to make that decision whether to make that pass or whether you want to draw the fake and go on again.

3.7 Teacher revisits/recapitulates and/or summarises lesson content

P5 Example: S10T4 L4 Int 11 (Basketball)

T: Can someone remind me what we learned today? What about defending? What are the four? F is for?

S: Follow

T: W is for?

S: Watch.

T: A?

S: Anticipate. When he is going to pass and where the ball is going to.

S3 Example: S58T8 L6 Int 11 (Basketball)

T: What did we first do today? What is the purpose of that?

S: Train your hands.

T: Train your left hand and your right hand. Two-handed.

Explicit (“Visible”) Performance Standards

Explicit performance criteria are identified by the written or spoken reference typically to the work expected of students in executing the activity, or work completed by students in executing the activity. This can include reference to both quality and quantity of work. Note that in some cases, the criteria might be reflected in feedback codes as well.

3.8 Technical

Teacher states the technical requirements. Technical reflects a basic task requirement or specifications in order to generate a competent answer or outcome.

P5 Example: S5T5 L1 Int 6 (Floorball)

T: So how do you do a forehand pass? Always remember the first thing, you must be in the correct stance. This is the forward stance. Next, the blade should be on the ground with the blade close to the ball.

S3 Example: S50T7 L1 Int 7 (Touch Rugby)

T: To pass to him, I must make sure that I am ahead of him. For example, if we are flat, either he steps back or I step forward so that I can pass the ball to him.

3.9 Explicit reference to quality

Explicit reference to descriptions outside of basic task requirements. For example: “I want you to write an introduction that grabs the reader’s attention”. Here, teacher provides descriptions that seek to improve the quality of the task, outside of the basic task requirements (which would be technical).

P5 Example: S5T5 L1 Int 1 (Floorball)

T: So a good dribble makes a lot of difference. To make a good dribble, the ball must be close to your stick.

S3 Example: S58T8 L1 Int 4 (Basketball)

T: If you cannot do fast, do slowly. Slowly like this. Once I get the ball, I quickly pass first. Don’t worry about the other one. For you, once you throw the ball, get ready to receive and pass. Receive, pass. Receive, pass.

3.10 Exemplars of Performance (Successful/Unsuccessful/Incorrect)

Includes showing exemplary student work. This could be the previous cohort students’ work, student work that is deemed to be good or correct, or model answers from the textbook. The teacher might highlight a student’s work as exemplary in the process of assessing it on the spot. For example, when the student has written a good introduction to narrative writing on the screen. Note that the teacher might indicate a student work as exemplary or undesirable without providing explicit performance standards (#1 above). It also includes instances when teacher models solutions to a problem.

P5 Example: S5T5 L1 Int 2 (Floorball)

Teacher has two students come up to the front of the class to perform the activity for his other students to observe. The activity involves the two students making five consecutive passes between each other with a warm defender (defender cannot intercept the ball) between them.

S3 Example: S58T8 L1 Int 4 (Basketball)

Teacher demonstrates the activity he wants the students to perform next with a group of 5 boys. The activity involves relay passing of the basketball as one member of the group while the other 4 boys rotate amongst themselves.

4 FEEDBACK

The pivotal role of feedback in student learning is evident in how feedback and learning are considered in relation to each other in the abundant literature. For instance, Pellegrino, Chudowsky and Glaser (2001) describe learning as a process of continuously modifying knowledge and skills and that feedback is essential to guide, test, challenge or redirect the learner’s thinking. Black and Wiliam (2009) argue that feedback is embedded into the instructional process in classroom, and should be understood as *moments of contingencies*, which are like critical points where learning changes direction depending on an assessment. Feedback is an important concept since it might give the students the possibility to elaborate on what is not yet understood, and enable teachers to get hold of students’ misconceptions and engage them in deep learning. According to Winne and Butler (1994), “feedback is information with which a learner can confirm, add to, overwrite, tune, or restructure information in memory, whether that information is domain knowledge, beliefs about self and tasks, or cognitive tactics and strategies” (p. 5740). Hattie and Timperley (2007), in a highly influential review of educational research define feedback as “information provided by an agent (e.g., teacher, peer, book, parent, self, and experience) regarding aspects of one’s performance or understanding.” (p. 81). Importantly, as Hattie (2012) reminds us, feedback typically comes second –after instruction – and thus its effectiveness is limited if it is provided in a vacuum.

Feedback is instrumental in two key ways: formative assessment and developing students' metacognition. An essential part of formative assessment is feedback to the learner, both to assess their current achievement and to indicate what the next steps in their learning trajectory should be (Black et al., 2003). Formative feedback, through self-, peer-, and teacher-assessment, helps students reflect on their own work, evaluate it against a standard, and improve it. By developing metacognitive skills, teachers effectively help students to think about their own thinking, gauge what they know and need to know, and learn how to manage their own learning by acquiring specific strategies. Teachers use opportunities for discussion and presentation of ideas, as well as formative assessment tools, to support students' reflective stance toward learning that helps them assess and direct their own emerging understandings.

Feedback constitutes the pivot of Hattie's (2009) theoretical underpinnings of *visible learning*, which involves making the process of teaching and learning as transparent (or "visible") to *both* teachers and students as possible. According to him, feedback can be correctional and it supplies information to *both teachers and students* involving critical task processing, task output, self-regulation and self-development. Teachers are aware of and aim to provide feedback relative to three levels: task, process, and self-regulation (Hattie, 2012).

1. Feedback at the **task level** is often termed 'corrective feedback' or 'knowledge of results' indicating to the learner the need for a better or different response based on the surface-level information provided. The teacher's feedback at the task/product level indicates to the student what might constitute correct or incorrect responses, providing more or different information relevant to the task set for the students, or even logistical assistance for engaging in learning activities. It also includes surface information such as clarifying the nature of the task requirements through specific comments on student work. It may also include a prescriptive reformulation of the student's response to enable the student to produce the accurate answer.
2. At the **process level**, feedback is largely in the form of cues, alternative strategies, error detection techniques or explicit ways to enable students grasp the relationships between ideas. The teacher may give explicit guidance to students about how to do an assigned task/activity. At this level,

feedback is aimed at the processes used by the students to create the product i.e. the procedures students employ in fulfilling the task. Process level feedback often enhances students' confidence and self-efficacy, which in turn provides resources for more effective and innovative information and strategy searching. At this level, feedback is essentially about the *procedures* or *processes* involved in completing the task thus, procedural knowledge becomes evident. NOTE: If you code for process feedback you must code for procedural knowledge.

3. Feedback at the **self-regulation level** is focused on the student's monitoring of one's own learning processes. Self-regulation feedback can enhance students' skills in self-evaluation, provide greater confidence to engage further with the task, assist in the student seeking and accepting feedback, and enhance the willingness to invest effort into seeking and dealing with feedback information. It becomes evident in the teacher's *deep, probing questions*; or teacher/student *acknowledgement* or *explicit reference* to knowledge and regulation of student cognition. Self-regulation level feedback can potentially guide the learner on when, how and why in selecting or employing task and process-level knowledge and strategies. NOTE: When you code for self-regulation feedback you must code for Metacognitive Knowledge. Because self-regulation feedback is task-related, code for Reflexive Talk only if it is also task-related. Note that Reflexive Talk can occur before or after the self-regulation feedback, in which case you would still code for Reflexive Talk.

4. Feedback at the **self level** directs the student's attention away from the task, processes involved, or self-regulation. It usually takes the form of praise (e.g. You're a good student!; Keep working hard; I really can't believe how you can be so careless?). [Note: For our present coding: Self level includes both praise and criticism of the student/s' personality or attitude.]

Hattie (2012) hypothesises that it is optimal to provide appropriate feedback at or one level above that at which the student is currently functioning in view of the fact that theoretically, the first three levels correspond to the phases of learning: from novice,

through proficient, to competent. Thus, ideally, teaching and learning need to move from the task towards the processes or understandings necessary to learn the task, and then to regulation about continuing beyond the task to more challenging tasks and goals.

We examine **three dimensions of the teacher's feedback** in the classroom:

1. ***What is the context of the feedback?*** (Code with reference to the *context*): The context in which the teacher's feedback is given ascertains the feedback audience i.e. who receives the teacher's feedback in the classroom - all students, groups of students or individual students? We code for:
 - a. **Whole class context:** The teacher responds to any task-related understanding and/or performance of learning (via an individual student, a group or the class) to the class as a whole i.e. the audience is the whole class, and not just an individual student or groups of students. Includes instances in which the teacher's feedback is in view of and/or tailored specifically for a particular student or group of students but the teacher explicitly addresses all students signalling her intent for all students to receive the feedback.
 - b. **Individual/Group context:** Teacher addresses an individual student, or a group of students responding to his/her/their understanding and/or performance of learning in relation to the task/activity.

2. ***What is the nature of the feedback?*** The kind of feedback teachers provide is broadly categorised into non-specific and specific feedback. Generally, feedback effective in enhancing learning is *specific*, in that it provides information about the learning goal with reference to the task, the processing of the task, or self-regulation (Kluger & DeNisi, 1996; Hattie & Timperley, 2007; Schute, 2008). Feedback that is not effective in enhancing learning is *non-specific*, and is typically, praise or criticism of the student's effort or attitude towards learning.

3. ***What is the feedback about?*** Is it about student work i.e. the quality of the task, the processes or strategies used, the student's own learning journey, or simply about the student's personality and/or attitude towards learning? As mentioned above, this aspect incorporates the four levels of feedback based on Hattie (2009): task, process, self-regulation, and self. For our present coding, other

than praise (e.g. I like the fact that you're so focused; Wonderful - I've seen you mature over the years!), feedback at the self level also includes negative remarks or criticism about the student's attitude or understanding of the task (e.g. You don't get it, do you? ; I think you are being lazy!).

For our present coding purposes:

1. We code for **feedback based on a task which is defined as “a deliberate student performance of learning or understanding”**. Examples of tasks therefore include activities such as using exit passes at the end of the lesson, students doing worksheets, etc. Thus, teacher's evaluative comment in response to a student's answer in an IRE sequence, need not be coded. This is because in an interactional/verbal context, it is easy to pick up feedback at the task or self level but process/self-regulation levels may not be easily discernable, which would result in under-coding for the same. [Hattie's 2009 model of four levels of feedback leans largely towards feedback based on student tasks in terms of a monologic transfer of information from the teacher to the student rather than privileging an interactive feedback mode between teacher-student or student-student.] Moreover, it may not be easy to distinguish between 'Ok' as a task-level feedback and 'Ok' used by the teacher as a filler in a whole class interaction. For consistency, adhere to feedback based on student progress on task. [This approach also helps to align with examination of feedback patterns based on student artefacts]
2. Feedback is coded only when tasks happen. We code for feedback based on Hattie's definition of task as some evidence or performance of student learning. We do not code for feedback based on Gordon Well's definition of feedback which is more interactional rather than task focused, ie the IRF for Wells counts as a form of feedback.
3. Positive Examples of Feedback:
 - a. Students write on whiteboard an answer and teacher provides feedback
 - b. Teacher gives exit pass to students at end of lesson, asking questions about what students learnt that interest them and what they are not sure and would like to learn more about. In the next lesson, teacher then addresses interesting answers and the most common answers. Teacher is giving feedback.

4. Negative Examples of Feedback:

KWL at the start of a lesson is not a task because a KWL (at the lesson start) just asks students for factual knowledge about what they know, or their prior knowledge. It isn't a performance of learning and hence any feedback provided by the teacher is not likely to enhance their student learning. On the other hand, if at the end of the lesson, the teacher links what the students want to know (the “W”) and what they have learned in a KWL structure, then this is a performance of student learning and hence any feedback provided at this point would count as feedback.

5. For feedback at the self-regulation level addressed to individual students or groups of students, almost always, the feedback needs to be **specific to the learning of the particular student or groups of students**. In other words, look for evidence that the teacher is surfacing and encouraging the student to monitor or reflect on his/her/their own learning style (through questions, explicit references, or acknowledgement) in order to meaningfully inform the student/s’ learning beyond the current task. Basically, the teacher’s feedback takes into account the characteristics of particular student/s’ learning and is not generally applicable to each student in the class. For example, the teacher says, “You had set a target of not making more than five spelling errors, right? How do you think you are doing? Are you ready for a more ambitious learning goal for spelling/dictation next week?”
6. In terms of feedback at the self-regulation level in a whole class context, look for evidence that the teacher is probing deeper or explicitly acknowledging aspects of student learning to meaningfully **inform not only student/s’ current task but also their future learning**. In other words, is the teacher highlighting something, which would enable students to step back and make a mental note for their future performance? For example, the teacher says, “So this is something you learn about yourselves. Even in counting sometimes you can make careless mistakes.” However, the teacher may draw students’ explicit attention to the task or processes involved in the current task but his/her feedback may not necessarily enable students to monitor their learning beyond the present task. For example, the teacher highlights, “If you make a mistake, more importantly, you must know what your mistake is, correct or not?”

7. Reflexive talk/metacognitive knowledge may include teacher’s feedback at the self-regulation level. However, say, if the teacher works out a problem on the whiteboard monitoring and reflecting on his/her own approach, metacognitive knowledge/reflexive talk is evident but this does not necessarily mean that teacher is providing feedback to students at the self-regulation level.
8. Importantly, when the teacher provides elaborate feedback (not necessarily useful!), it becomes difficult to tease apart the different aspects and make a call about the overall nature of the feedback. In such cases, the coder needs to **analyse and ascertain each aspect of the teacher's feedback** and code accordingly. For example, the teacher points out, “You have been asked to compare ideas – how do they relate to one another? (Process level). Decide for yourself what will help you make a fair comparison. Tell me which method gives you more confidence and why (Self-regulation level).” In this instance, the teacher’s feedback would be coded both at the process and self-regulation levels despite the natural progression from process to self-regulation level feedback. In another lesson, the teacher notes, “This is not the correct sequence of how the story unfolds (Specific task level). Can you use a different, more effective strategy than guesswork please? (Process level). Here, the teacher’s feedback ‘graduates’ from the task to the process level, and would be coded as both feedback at the task and process levels.

4.1 Teacher Feedback: Whole Class (*whole class context*)

Teacher provides feedback to the whole class based on the performance and/or understanding of an individual student or group of students. For instance, the teacher may engage in some formative monitoring as s/he walks around the class and obtain a sense of common difficulties or misconceptions most students have. To scaffold students’ understanding, the teacher may provide feedback addressed to all the students, which often takes the form of re-teaching to ensure students’ mastery of the concepts.

4.1.1 Non-specific Self level feedback: *Personal evaluation and affect about the learning*

Examples:

1. Teacher addresses the class: “This class is just not up to the mark. You need to get your act together!”

2. Teacher tells her students: “Most of you do work consistently throughout the year and it shows!”

P5 Example: S2T5 L5 Int 2 (Tchoukball)

T: The reason why I called all of you back is because many of you all are not focused today.

S3 Example: S58T8 L6 Int 11 (Basketball)

T: I see you improved a lot. You improved so much. The most improved player. More confidence, ok, can?

4.1.2 Non-specific Task level feedback: *How well has the task been performed; is it correct or incorrect?*

Examples:

1. Teacher tells her students: “Listen 3E4 – Most of you have shown a lot of improvement but still you need more practice.”
2. After checking on some students’ work, teacher says, “I noticed most of you are doing fine.”
3. A teacher says with satisfaction: "Ah, you’ve taken everything into account - well done!

P5 Example: S2T5 L5 Int 8 (Tchoukball)

T: One thing I am very certain is that today just because we changed the equipment, you have forgotten your strategy, the way to pass, the rules.

S3 Example: S50T7 L3 Int 15 (Touch Rugby)

T: But I thought today was quite good in terms of we were able to understand a lot more of the concept of play and we do realize what are some of our common mistakes that have been happening throughout also.

Specific Feedback (learning enhancing)

4.1.3 Specific Task level feedback: *How well has the task been performed; is it correct or incorrect?*

Examples:

1. Teacher tells his students: “You’ve got it all muddled up children. Think of a different way of approaching this challenging problem.”
2. Not satisfied with her students’ performance, the teacher makes an evaluative comment: “This work does not seem to come from P6 students. Guess this is how you developed concept maps in P3!”
3. Teacher goes through the marked worksheets with the whole class: identifying common errors, and projecting the ‘model’ answer for each question as students go about doing their corrections.

P5 Example: S2T5 L1 Int 6 (Tchoukball)

T: You can all see it. Many of you are dominating the game, thinking that there are only two people in the team. When there is somebody else totally open, you still do not want to pass to that person. You are so used to passing to the same person over and over again, and usually they are the stronger players.

S3 Example: S60T11 L5 Int 10 (Softball)

T: For batters, for those of you practicing the batting, do not take the foul ball. Some of you are still tempted to take. So, if it is a foul ball that is being thrown, do not take the ball because in a game, it’ll be a strike, strike one.

4.1.4 Specific Process level feedback: *What are the strategies needed to perform the task; are there alternate strategies that can be used?*

P5 Example: S2T5 L5 Int 8 (Tchoukball)

T: One thing that was lacking today was the switch of play for most teams. But switch of play only works for you if your team feels that it is useful.

S3 Example: S50T7 L1 Int 3 (Touch Rugby)

T: Ok, so, one of the main things in this game itself, I really want you guys to keep your eyes up, especially do some side-steps...so if the person comes, what could you have done? (Student demonstrator moves back). So either you backpedal or side-step away from me which is what some of you have been doing during the game itself.

4.1.5 Specific Self-regulation level feedback: *What is the conditional knowledge and understanding needed to know what you are doing? Self-monitoring, directing the processes and tasks*

Examples:

1. Teacher engages in some reflexive talk: “Think about what are the things that you did right and what are the things that you did not do right?”
2. Teacher uses deep, probing questions to stimulate her students to think about which learning strategies work best for them.

P5 Example: S2T5 L3 Int 2 (Tchoukball)

T: Just as I expected, when the game started, someone came to me and asked me “What do I do now?”

S3 Example: S54T11 L5 Int 10 (Floorball)

At the end of the lesson, the teacher asks the students how many of them can tell him the factors that determined whether they won or lost. The students gave him answers such as coordination, skill, speed, luck, enemy goalkeeper.

T: That is why every team that comes out, I will ask you all the same question. What are the things that you did right and what are the things that you did not do right. And these are the things you need to ask yourself, not just for Floorball, but for anything that you do, including your group project, including your studies also.

4.2 Individual/Group (meant for individual students/groups of students)

Teacher provides feedback to individual students or groups of students based on their performance and/or understanding. As compared to feedback, which is meant for all students, feedback catered to groups of students and specifically, to individual students has greater potential for engaging students in their learning as it is more specific to student/s’ needs and abilities and provides a more robust indication of student/s’ progress towards their learning goals. However, the potential for enhancing student learning becomes nullified if the feedback is non-specific in nature, providing no indication to the student/s about which aspects of the task need to be addressed and/or in what way.

Non-specific Feedback

4.2.1 Self level feedback

Examples:

1. Teacher rebukes a student: “With this kind of an attitude, don’t expect to win the game!”
2. A teacher showers praise: “You are one of the best players in today’s game. Keep it up!”

P5 Example: S10T4 L4 Int 9 (Basketball)

T: Good shot, Student A. Improving!

S3 Example: S58T8 L1 Int 3 (Basketball)

T: Come on, Student.

4.2.2 Task level feedback

Examples:

1. Based on a student’s factual account, teacher mentions, “I’m really impressed by the strategies that you’ve used today against the opposite team.”

P5 Example: S3T5 L1 Int 3 (Floorball)

Teacher says “Good, nice” when the students were able to complete the activity he set of five consecutive passes.

S3 Example: S58T8 L1 Int 4 (Basketball)

Teacher says “Try. Good. To the side. Very good.” as the students engaged in the activity they are tasked to perform.

Specific Feedback (learning enhancing)

4.2.3 Task level feedback

Examples:

1. A teacher points to the inadequacy of her student’s performance: “Can’t really say you are able to keep to the pace.”

P5 Example: S5T5 L1 Int 2 (Floorball)

T: Student A, feed the ball properly, or else the game cannot get started.

S3 Example: S58T8 L1 Int 4 (Basketball)

T: After you receive, quickly look to pass. Pass. Run to the side. After pass, must run. Very good. Well done.

4.2.4 Process level feedback

Examples:

1. Addressing a group of students, teacher remarks: “Do you think this travel brochure can be made more illustrative and eye-catching? Perhaps, you may want to leverage on your group members’ individual strengths?”
2. Teacher tells a student who is making slow progress, “Guess, you can first list down the key points and then work from there. This way you can compare and see whether the points overlap and you can avoid repetition.”

P5 Example: S2T5 L5 Int 8 (Tchoukball)

T: Face the direction and pass. Drag and push, drag and push.

S3 Example: S60T11 L5 Int 3 (Softball)

T (to the student pitching the ball): Too high! And it is only one turn. It’s not a lot, not like cartoon. No matter how fast you spin also, the speed is the same, it won’t spin faster. So you spin, you throw at your waist, ok? Not like that.

4.2.5 Self-regulation level feedback

P5 Example: S12T5 L9 Int 12 & 13 (Badminton)

T: One thing I am very certain is that today just because we changed the equipment, you have forgotten your strategy, the way to pass, the rules.

No example observed for S3.

Possible example for S3: A student is learning to serve the volleyball. The teacher asks him/her to think about what he/she has learnt so far and how he/she should hit the ball in order to generate enough power for the ball to cross the net.

4.3 Student Feedback (whole class/individual/group contexts)

Students, too often, view feedback as the responsibility of someone else, usually teachers, whose job it is to provide feedback information by deciding for the students how well they are going, what the goals are, and what to do next (Hattie & Timperley, 2007). Hattie (2012) points out that when teachers enter their classrooms intending to seek and receive feedback from students about the effect of their teaching—both about their instruction, messages, and demands and about whether students need specific assistance, different strategies, or more or repetitions of particular information—the students are the major beneficiaries. These forms of feedback enable the teacher to adapt the flow of the lesson; to give needed directions or information to maximize students' chances of success; and to know whether it is necessary to reteach or offer different tasks, content, or strategies.

Note:

1. Do **not** need to code for the nature (i.e. specificity or level) of the student feedback.
2. Student feedback to teacher or student/s to be coded in whole class/individual/group contexts.
3. Student feedback to teacher or other student/s may be evident without teacher providing any explicit opportunity or when the classroom participatory structure or task design presents opportunities for student feedback for e.g. during a peer critique exercise.

4.3.1 Student to Teacher Feedback

Students could potentially, seek feedback from their teacher via informal interactions in class; questions designed to seek re-teaching; or corrections to assignments, test and project evaluations. Basically, student feedback to their teacher could be initiated by the students themselves or say, when the teacher invites students to clarify their understanding. For example, the teacher asks, “Any questions? Are you quite clear about the factors that affect the rate of evaporation?”

In general, there are 2 conditions that must be met before we code for S-T Feedback:

1. Students give feedback (i.e., explicit reference) about their own performance of learning or understanding.
2. The nature of the utterance is NOT a question directed at the teacher.

Note that we **DO NOT** code for

1. When students **SEEK** feedback about their own performance of learning/understanding. For example, student was practising to throw a ball and isn't sure if it was done correctly, he asks T: "Is this correct, teacher?" This is a question directed at the teacher that may solicit the actual teacher feedback. Do not code when the student asks the question, code only when the teacher gives the feedback.
2. When students give feedback about teacher's instructions. E.g., "Teacher, your explanation about the rules of the game was very clear".

P5 Example: S11T5 L2 Int 4 (Softball)

S: So I was throwing the ball and I just throw opposite so it was slow.

S3 Example: S51T9 L5 Int 11 (Netball)

T: Why are you all better than them? Why do you all win?

S: If you flip already, then you just faster throw the ball. Don't wait for everyone to crowd around you.

4.3.2 Student to Student/s Feedback

An ideal learning environment or experience occurs when both teachers and students seek answers to their questions but too often, teachers limit students' opportunities to receive information from other classroom participants. Student feedback to their peers becomes evident when students clarify information, process aloud for confirmation from their peers, or it may even take the form of peer teaching. Thus, students' feedback to other students can be initiated by the students themselves or say, when they discuss in pairs the classwork assigned individually, or it may be part of the teacher's task design. For instance, the teacher may provide spaces for students to verify or evaluate their grasp of lesson content through simple strategies such as 'Pair and Share' or 'Turn and Talk' during individual seatwork, or during whole class teacher-led contexts such as the teacher's exposition or IRE sequences. For coding purposes, look out for student/s responding to any performance of learning (by an individual student, a group or the class as a whole).

P5 Example: S9T5 L6 Int 9 (Badminton)

Teacher has students give their observations of how their fellow students play badminton.

S3 Example: S54T11 L1 Int 3 (Floorball)

Teacher speaks to one student and asks him what his partner is doing wrong. He then asks the student to provide feedback to his partner regarding the way he holds his stick as he is the more experienced one. The student then provides some feedback to his partner regarding his mistake.

4.4 Teacher-Student Interactive Feedback (*whole class/individual/group contexts*)

Beyond a one-way communication of feedback from the teacher or student, an interactive exchange may become evident between the teacher and student/s. From a pedagogical standpoint, interactive feedback opens up more space for students to make sense of and work on the feedback as student/s have the opportunity to seek clarifications or obtain relevant details there and then, and take the necessary steps to accomplish the task or learning goals. Research shows that feedback without engagement is unproductive (Price et al., 2011) and unilateral feedback is limited, given the assumption that students are passive learners and thus, it fails to address learning misconceptions (Ajjawi & Boud, 2017; Boud & Molly, 2013). Dialogue in feedback is advocated (Boud & Molly, 2013) but rarely executed though students prefer such engagement (Gamlem & Smith, 2013; Chardon et al., 2011). Typically, the teacher's feedback accompanied by questions particularly, open questions potentially pave the way for two-way feedback interaction by which students can promptly address their learning needs in a classroom environment characterised by emotional safety and respect and thus, interactive feedback plays a key role in promoting students' metacognition.

In view of our present coding, interactive or two-way feedback needs to be distinguished from a question-answer sequence or any other verbal exchange among classroom participants in the sense that the basis of the conversation is the feedback about student performance and/or understanding in relation to: task/activity or his/her progress towards the learning goals. Again, this interactive feedback may be teacher-initiated or student-initiated in a whole class setting, or when students undertake their

assigned tasks individually or in pairs/groups. For our present coding purposes, an instance of interactive feedback is defined by **at least 4 turns**.

Interactive feedback in the classroom may be initiated by the teacher and/or student/s. For instance, the teacher may engage with a student about the written feedback s/he has provided, to ensure that the student is able to work with the comments and address the mistakes properly. Often, interactive feedback becomes a fruitful avenue for teachers to engage with students whom s/he perceives are making relatively, slower progress. Again, a student may strike up a conversation with the teacher based on a verbal/written remark about the work s/he has done previously or an assignment on which s/he is currently working. Interactive feedback among student/s and teacher may be present say, when a group of students presents their work and teacher offers feedback with other student/s joining in and thus, a productive and meaningful interaction ensues.

Note:

1. Interactive feedback between teacher and student/s to be coded in whole class/individual/group contexts.
2. Minimum of 4 turns must be evident.
3. May be student-initiated or teacher-initiated.
4. Code for the nature (i.e., specificity or level) of the teacher's feedback in the interactive exchange, as and when evident (similar to coding for each aspect of the teacher's feedback when it is elaborate and monologic).
5. Do **not** need to code for the nature (i.e., specificity or level) of the student feedback in the interactive exchange (same as 4.3).

Protocol:

1. If T initiates feedback, begin to keep Interactive Feedback in mind (because you have to monitor if it hits or exceeds 4 turns of feedback exchanges)
 - a. Code for Teacher Feedback (Whole class, individual/group). Code for the various types of feedback the T gives during these turns.
 - b. Check for 4 turns. If it hits 4 turns, code for T-S Feedback. Code for the various types of feedback the T gives during these turns.
2. If S initiates feedback, begin to keep Interactive Feedback in mind
 - a. Code for S-T feedback or S-S feedback

- b. If it hits 4 turns AND it involves the T, code for T-S Feedback (S-S feedback that hits 4 turns will not be coded for T-S Feedback)

Example:

The teacher reiterates the point she has made earlier.

- 1 T: This is incorrect. I told you use both hands when when throwing the ball in the basket.
- 2 S: Err teacher I thought ...
- 3 T: Well, kindly try it agian.
- 4 S: Oh okay, doing it now.

No examples were observed for both P5 and S3.

Possible example for P5 and S3: (Hypothetical)

Teacher gathers the whole class once the activity is over and discusses the activity that the student were just performing for more than 4 turns. (However, this is unlikely to be observed in PE as the general directive is to minimize the amount of talking the teacher does and to let the students engage in activity instead)

5 GENERIC FOCUS OF KNOWLEDGE WORK

In scale #5, we focus on the generic of the knowledge work that teachers ask students to engage in.

Code for the absence or presence (0/1) of each focus of knowledge in each phase.

Multiple codes per phase are permissible – and likely.

5.1 Factual Knowledge

Factual knowledge is propositional knowledge (dates, events, facts, names, equations, definitions, algorithms, and etc). Propositional knowledge is either true or false. It could be knowledge of terminology, specific details and elements. Factual knowledge can be presented in the form of talk, written or printouts.

Possible indicators of factual knowledge in Physical Education: instruction that focuses on

- concepts, terms and facts

- definitions
- non-fact based generalisations

Examples:

- “*This is a football and this is a rugby ball*”
- *Teacher gives out a test that students have to fill out regarding their knowledge about Netball.*

P5 Example: S2T5 L1 Int 2 (Tchoukball)

T: First up, for Tchoukball, we’ve got two nets. What are the correct names for it?

S: Frames.

T: Tchoukball frames or? Starts with R.

S: Rebounder.

S3 Example: S51T9 L7 Int 1 & 2 (Netball)

Teacher gives the students a short MCQ on what they have learnt about Netball before going through the answers with them after.

5.2 Procedural Knowledge

We define procedural knowledge as knowledge that focuses on *how* an epistemic agent undertakes and completes a task specific to a discipline, subject or area of study. It can refer to quite general procedural issues – methods of inquiry, particular methodologies, genres of work – or, more narrowly, to task-specific scripts, strategies, algorithms, heuristics involved in solving a problem or generating knowledge claims. Procedural questions are generally *how* rather than *why* or *what* questions. Importantly, procedural knowledge is often closely associated with **conditional knowledge** – that is, knowledge of when to use specific procedures or algorithms. Thus, procedural knowledge often includes domain specific tasks/work on *when* as well as *how*. Now, it is often difficult to distinguish procedural knowledge from **conceptual knowledge** since knowing what procedure to apply and when to apply it presumes some measure of conceptual understanding of the problem – otherwise one would not know what procedure to use and when to use it. Without some measure of conceptual knowledge then choosing what procedure to use would be more or less random.

Possible indicators of procedural knowledge in PE:

Instruction that focuses on:

- *The techniques to carrying out the skill*
- *The nature of the skill*
- *Repetitive practice*
- *Understanding and applying a strategy while following the rules of the game*

Examples:

Student knows when to use a bounce pass or a chest pass when playing netball

P5 Example: S2T5 L1 (Tchoukball)

Students are able to execute different types of passes. They understand the rules of the game. They are able to execute various strategies to varying degrees.

S3 Example: S50T7 L1 Int 5 (Touch Rugby)

Teacher is demonstrating how students can pass the rugby ball using spin as well as how they should twist their bodies when doing so.

T: So if I go on the left, I can use a one-hand spin pass, or two-hand to direct to where I want it to be. And you can see how our legs are moving. If we are going this side, we will actually shift our legs so that we will have a wider range and if we go on the right, we will actually shift our legs as well.

5.3 Conceptual Knowledge

Conceptual knowledge focuses on the meaning of concepts and the relationships between concepts e.g., tree and forest, light and gravity, revolution and nationalism, sincerity and authenticity, square and triangle, etc. etc. Conceptual knowledge then is not mere semantic knowledge – the meaning of words – but also, critically, relationships, patterns, networks and connections between ideas rather than propositional knowledge (discrete bits of information or factual knowledge). Conceptual knowledge is most evident when teachers focus on **meaning making** by engaging in understanding talk – by asking them to **clarify** the meaning of what they say (as in “What do you mean?” “Do you mean X or Y?”), or to make **connections** between concepts (“What is the relationship between X and Y?” “You say X but what

about Y?”). Generally speaking, students need to gain some measure of conceptual knowledge of an idea if they are to achieve **understanding** of the idea, **apply** it creatively to new situations, **interpret** a text (or painting), develop an **explanation** of something or **communicate** meaning in some way.

The central preoccupation then of conceptual knowledge is with developing understanding. But what is understanding and why is it so important? Good and Brophy (2003), for example, suggest that “Understanding means that students learn both the individual elements in a *network* of related content and the *connections* among them so that they can explain the content in their own words,” they write. “True understanding goes beyond the ability to define concepts or supply facts. It involves making *connections* between new learning and prior knowledge, subsuming the new learning within larger networks of knowledge, and recognizing at least some of its potential applications.”² Anderson and Krathwohl (2001) similarly argue that cognitively speaking, students understand “when they are able to construct meaning from instructional messages, including oral, written and graphic communication. Students understand when they build *connections* between the new knowledge to be gained and their prior knowledge. More specifically, the incoming knowledge is integrated with existing schemas and cognitive frameworks” or used to actively reconstruct existing frameworks (p. 63). They also claim, more generally, that in principle, understanding tasks attempt to develop an understanding of “meaning in order to promote transfer of learning: requires students not only to remember but to make sense of and be able to use what they have learned.” (p. 63), so too Wiggins and McTighe (2005) who suggest that “To understand is to make *connections* and bind together our knowledge into something that makes sense of things (whereas without understanding we might see only unclear, isolated, or unhelpful facts). But the word also implies doing, not just a mental act: a performative ability lies at the heart of understanding ... To understand is to be able to wisely and effectively use – transfer – what we know, in context; to apply knowledge and skill effectively, in realistic tasks and settings. To have understanding means that we show evidence of being able to transfer what we know. When we

² Good and Brophy, *Looking in Classrooms*, 9th ed., 407-408..

understand, we have a fluent and fluid grasp, not a rigid, formulaic grasp based only on recall and ‘plugging in’³ (pp. 7-8).

Conceptual knowledge focuses on both the meaning of concepts and relationships between concepts. Thus, Hiebert and Lefevre to the effect that “conceptual knowledge is knowledge that is rich in relationships... a connected web of knowledge, a network in which the linking relationships are as prominent as the discrete pieces of information” (quoted Putnam, Lampert and Peterson, 1990, p. 83). Importantly, however, Putnam, Lampert and Peterson insist that “conceptual competence” or conceptual knowledge depends on an understanding of procedural knowledge: “procedural knowledge must form the basis for conceptual understanding” (p. 84). However, other researchers have taken a different view. For example, while Rittle-Johnson and Alibali (1999) suggest that procedural knowledge and conceptual knowledge lie on a continuum and cannot always be separated. Still, the two ends of the continuum represent different types of knowledge. They highlight the causal, bidirectional and iterative relationship between conceptual and procedural knowledge. Increase in one type of knowledge can lead to gains in the other type, which in turn may lead to further increases in the first. But although they recognise that conceptual and procedural knowledge influence one another, they go on to suggest, contrary to Putnam, Lampert and Peterson, that conceptual knowledge has greater influence on procedural knowledge than the reverse. Children who received conceptual instruction led to better transfer performance than procedural instruction. Anderson and Krathwohl (2001) argue similarly that ‘conceptual knowledge and deep understanding can help individuals as they attempt to transfer what they have learned to new situations.’ Whatever the case, what we expect is that in Singapore there is generally a stronger focus on procedural knowledge than on conceptual knowledge.

Possible indicators of conceptual knowledge in PE:

An instructional focus on

- *understanding of the meaning of definitions*

³ Wiggins and McTighe, *Understanding by Design*, 2005, pp. 7-8). In effect, understanding involves meaning making, understanding concepts (i.e. conceptual knowledge) and the exercise of cognitive agency. See also Gordon Wells 83ff for a discussion of knowing and understanding, and Richard Mason, *Understanding Understanding*, for an epistemological take on the issue.

- *understanding of the concepts of passing, moving, techniques, strategies*
- *understanding the role of physical activity*
- *making connections between different physical activities, exercises and games*
- *understanding of how techniques or strategies from one activity can be adapted for use in another activity*
- *understanding how a technique/concept from an activity or exercise relates to other disciplines or real world situations*

Example:

The unit is on netball. Teacher calls out 3 students to stand in front of the class and she asks the students to stand in a line, with one student standing in the middle, playing the defender. Teacher then asks the rest of the students to say what forms of passing should the students use to bypass the defender.

Students offer the following suggestions:

- *Bounce pass around the defender*
- *Overhead pass above the reach of the defender*

P5 Example: S2T5 L1 Int 4 (Tchoukball)

T: What I can see is that you all like this frame so much and you all forgot about the other frame. Two people standing there, waiting for the ball but you just want to keep.

S: Because we are nearer here.

T: Nearer, yes, but every time you shoot, the opponent catches the ball. What's the point? What I want you to try for the next round is when you want to shoot, I want you to quickly change direction and throw it to the other side.

S3 Example: S58T8 L1 Int 4 (Basketball)

Teacher instructs students to engage in an activity that focuses on the concepts of passing and moving using basketballs.

5.4 Epistemic Knowledge

Epistemic knowledge is knowledge of domain-specific criteria and standards that allows individuals to distinguish “knowledge” from mere information, opinion or belief by appeal to domain specific criteria - truth, reliability, validity, coherence, authenticity,

clarity, reasonableness, principled, disinterested, goodness, or beauty. These standards establish the public authority of the knowledge claim.

Possible indicators of epistemic knowledge:

- points out the difference between *correct* and *reliable*
- insists that student perspectives or views must be *sensible or reasonable*
- says student reasoning should show *imagination* and *creativity*
- focuses on *why* particular standards are they reasonable or appropriate for particular texts or contexts

P5 Example: S11T5 L5 Int 4,5 (Softball)

T: The reason why I choose this cone to hold the ball, it is because the ball would be between the knee and shoulder. In an actual game of softball, they will have a ball that they will throw underarm and when they throw, there is a requirement.

Then the teacher demonstrated with another student what the requirement was.

T: When you pitch the ball to this person, it has to be between the shoulders and the knee. This is to ensure that the person batting the ball can bat it.

No examples observed for S3.

Possible example for S3: (Hypothetical)

Teacher explains to students that by bending the knees and adopting the proper stance, the students will be able to improve their shooting technique in Basketball.

5.5 Rhetorical Knowledge

Conventionally understood, rhetorical knowledge is knowledge of what language is appropriate and skill in the effective use of language in a particular context. In short, rhetoric is the art of using language to *communicate effectively*. Specifically, rhetorical knowledge is knowledge of how to use language (in its broadest sense) to *convey or communicate meaning* in a transparent, clear, logical and effective way in relation to purpose, audience and context (its principle modern meaning) and/or how to *persuade* others of the validity, value or reasonableness of an argument or perspective (its classical meaning) that assumes some understanding of how *different audiences* will respond to speech or text (see J. Guillory, “Literary Studies and the Modern System of the Disciplines” in Anderson and Valente, 2002, p. 22). However, since the 1970s,

studies of the social and contextual nature of language use and, more broadly, discourses, has expanded the understanding of rhetoric as essentially a form of procedural knowledge to an understanding of rhetoric as a medium of knowledge production. As one source puts it, during the course of the 1970s and 1980s, "the search for a social theory of writing became broadly interdisciplinary. Composition scholars studied not only writing but all aspects of language use, which they regarded as actually creating knowledge, not merely disseminating it. These interests have been shared with scholars in history, literary criticism, philosophy, psychology, sociology, and speech communication. Scholars in all these fields sought an account of discourse—language in use—that acknowledges the power of rhetoric to help create a community's worldview, knowledge, and interpretive practices. Literary-critical theories of the role of the reader in making meaning also discuss the establishment of interpretive practices. Stanley Fish describes readers as participants in interpretive communities, which are defined by their agreement on the conventions of discourse. Fish's work suggests a method for analysing the conventions a writer must learn to enter the academic discourse community. No taxonomy of such conventions has appeared, although studies of a number of fields have exposed much about disciplinary conventions. More recently, studies of writing in various disciplines have revealed and analysed the social creation of disciplinary knowledge through discourse." (Bizzell, Reynolds & Herzberg, 2004).

Example: Using the correct terminology when instructing and/or discussion.

No examples were observed for P5 and S3.

Possible example for P5 and S3: (Hypothetical)

During a Netball lesson, a student is talking to the teacher about how the opposing team's "blocker" was very strong. The teacher then corrected her saying "Which defender are you talking about? The GD or GK?"

5.6 Hermeneutical Knowledge

In the English Language classroom, hermeneutical knowledge involves the teacher encouraging students to engage with text in terms of pragmatic competence and critical competence. Pragmatic competence implies using text functionally by knowing about and acting on the different cultural and social functions texts perform inside and outside of school, and understanding that these functions shape the way texts are structured,

their tone, their degree of formality, and their sequence of components. Essentially, critical competence critically analysing and transforming texts by acting on the knowledge that texts are not ideologically natural or neutral – that they represent particular points of views while silencing others and influence people’s ideas. It also involves acting on the knowledge that the designs and discourses of text can be critiqued and redesigned in novel and hybrid ways. Hermeneutical knowledge positions the student as a text user (‘what do I do within this, here and now?’) and text analyst (‘what does all this do to me?’). A hermeneutical focus is evident in text use (How do I use the information?) and text analysis (How does the information position and influence me?).

Not applicable in PE.

5.7 Metacognitive Knowledge

Metacognition is about learning how to be mindful of one’s thought processes and think strategically. According to Flavell (1979), there are two intercorrelated dimensions to metacognition: knowledge of cognition (also known as metacognitive knowledge) and regulation of cognition (metacognitive regulation).

Knowledge of cognition is what we know about memory and our thought processes. It is assumed to include three components (Bruning, Schraw & Norby, 2004):

- i) declarative knowledge, i.e., knowledge about ourselves as learners and knowing what factors influence our performance
- ii) procedural knowledge, i.e., knowledge about doing things (cognitive strategies). Much of this knowledge is represented as heuristics and strategies.
- iii) conditional knowledge, i.e., knowing when or why to use declarative and procedural strategy

Regulation of cognition is how we control our learning and it also consists of three components:

- i) planning, which involves selecting appropriate strategies and allocating resources that affect performance
- ii) monitoring, which involves self-testing skills necessary to control learning

iii) evaluation, which involves appraising the products and efficiency of one's learning

Studies have reported significant improvement in learning when regulatory skills and an understanding of how to use these skills are included as part of classroom instruction (Brown & Palincsar, 1989; Cross & Paris, 1988). Basically, metacognition helps us make the most of our mental resources.

Possible indicators of metacognitive knowledge in PE (instruction that focuses on):

- *setting specific personal learning goals relative to a specific type of knowledge*
- *encouraging students to think aloud the strategies and methods they use to improvise or achieve the objective of the activity*
- *teacher thinking aloud how he/she thinks about and monitors his/her performance and not simply how he/she performs a task.*
- *teacher telling learners about his/her thinking and the motivation for selecting certain strategies when improvising or achieving the objective of the activity.*
- *guiding students to develop an understanding of what they know and do not know*
- *helping students develop an appreciation of what learning tasks might demand, as well as an awareness of the particular knowledge and strategies they can bring to these tasks*
- *encouraging students to develop a sense of their own knowledge by asking questions such as “What do I know?”, “What don't I know?” “What do I need to know?”*
- *encouraging students to develop a reflective stance toward learning that helps students assess and direct their own emerging understandings*

Example:

Teacher shares how a student monitored his thinking process as he was faced with a defender and wanted to achieve his objective of scoring a goal during football.

P5 Example: S11T5 L2 Int 4 (Softball)

Teacher shared his thought process on how to adjust his throwing strategy to out the runner (as he is the pitcher) in softball, depending on the speed of the runner.

S3 Example: S54T11 L5 Int 10 (Floorball)

At the end of the lesson, the teacher asks the students how many of them can tell him the factors that determined whether they won or lost. The students gave him answers such as coordination, skill, speed, luck, enemy goalkeeper.

T: That is why every team that comes out, I will ask you all the same question. What are the things that you did right and what are the things that you did not do right. And these are the things you need to ask yourself, not just for Floorball, but for anything that you do, including your group project, including your studies also.

5.8 Moral and Civic Knowledge

Moral knowledge conventionally focuses on two kinds of moral judgements or beliefs -- conceptions of the good or value (eg., what constitutes a good life) and conceptions of the right (as in what is the right way to act, in general or in a particular situation) – and the justification of these beliefs or principles. Most moral theories commit to both sets of principles, although they can provide radically different accounts of both. Similarly, they can construct the relationship between the two sets of issues differently. Civic knowledge focuses on the institutional knowledge (eg. political institutions, processes and actors) and the underlying moral and civic principles (e.g., democracy, communitarianism, nationalism, citizenship, Confucianism, Islam) used to justify political arrangements.

Possible indicators of moral knowledge in PE:

- *students are aware of fair play and to stop the game when a player goes down injured*
- *students are aware that cheating is wrong and should avoid doing so*

P5 Example: S2T5 L3 Int 2 & 3 (Tchoukball)

T: How many of you all saw someone breaking the rules? How many of you all knew that you broke the rules? Ok, put down your hand...but this is what we have rules for. Rules are there for what purpose?

S1: Lead a normal life.

S2: For safety.

S3: Maintain order in the game.

No examples observed for S3.

Possible example for S3: (Hypothetical)

During a game of Netball, one of the students accidentally commits a foul on the other team and admits to her mistake on her own, relinquishing control of the ball to the other team.

5.9 Aesthetic Knowledge

Aesthetic Knowledge focuses on two key aspects - (a) understanding and (b) evaluating/justifying domain-specific standards by which some performance, artefact, material is deemed to be of certain (positive or negative) quality. Key to Aesthetic Knowledge is the evaluation and justification aspect. If this is not present, we do not code for Aesthetic Knowledge. Look for technical terms which will reflect on standards/norms.

Possible indicators of aesthetic knowledge in PE:

Instruction that focuses on

- *appreciation of techniques performed accurately and with purpose*
- *appreciation of team play or of combination of actions*
- *appreciation of how certain techniques and combinations of actions can represent beauty.*

P5 Example: S5T5 L5 Int 9 (Floorball)

T: Oh, nice, nice. Though you did not get the goal, you did it very beautifully.

No examples observed for S3.

Possible example for S3: (Hypothetical)

Teacher was giving feedback to a group of students practicing their batting technique.

T: Student, that was a nice swing. You connected beautifully with that ball. Did you see how far it went?"

6 EPISTEMIC FOCUS OF CLASSROOM TALK (WHOLE CLASS, INDIVIDUAL AND GROUP)

Capturing the epistemic focus of classroom talk accurately is especially important because it will allow us to deepen our understanding of how knowledge and understanding are constructed through the median of talk in the classroom.

By **epistemic focus** we mean what kinds of knowledge issues are in play when teachers and students talk in class, whatever the social organization of the lesson at the time. Epistemic (Knowledge) talk is talk that focuses on the substantive issues of knowledge content and/or skill development.

We will code for the following forms:

1. Factual/Descriptive Talk
2. Procedural Talk
3. Explanatory Talk
4. Temporal Connections
5. Conceptual Connections
6. Framing Talk
7. Reframing Talk
8. Justification Talk
9. Reflexive Talk (Learning Talk)
10. Performative Talk
11. Epistemic Virtues Talk
12. Moral/Values Talk

Code for the absence or presence (0/1) of each form of classroom talk in each phase. Multiple codes per phase are permissible – and likely.

6.1 Factual Talk

Factual talk is talk about propositional or factual knowledge (dates, events, facts, names, equations, definitions, algorithms, and etc). Telling students about the inventions of the ancient Chinese civilization is factual talk. Similarly, highlighting statistical data about a country's demographic profile is factual talk. Factual talk often

involves descriptive talk – descriptions of a state of affairs. Code for Factual Knowledge whenever you code for Factual Talk.

Examples:

- *“This is called a football and those are goalposts”*

P5 Example: S2T5 L1 Int 2 (Tchoukball)

T: First up, for Tchoukball, we’ve got two nets. What are the correct names for it?

S: Frames.

T: Tchoukball frames or? Starts with R.

S: Rebounder.

S3 Example: S51T9 L1 Int 1 (Netball)

T: What is this? Straight one to the chest is called the...? Straight chest pass.

6.2 Procedural Talk

Procedural talk is talk that focuses on how students complete a process or task specific to a discipline, subject or area of study. It can refer to quite general procedural issues – methods of inquiry, particular methodologies, genres of work – or, more narrowly, to task-specific scripts, rules, procedures, strategies, algorithms, heuristic or resources and tools (e.g., a dictionary, a protractor) involved in solving a problem or doing knowledge work. Procedural questions are generally how rather than why or what questions. Procedural talk can focus on routine procedures or it can involve procedures with connections involved in more complex forms of knowledge building. It can also include talk about when as well as how. Code for Procedural Knowledge Focus whenever Procedural Talk is coded.

Examples:

- *“The first step is to analyse the position of the defender. Once we have done that, then we can decide how we want to pass to our teammates.”*

P5 Example: S2T5 L5 Int 8 (Tchoukball)

T: Face the direction and pass. Drag and push, drag and push.

S3 Example: S50T7 L1 Int 5 (Touch Rugby)

Teacher is demonstrating how students can pass the rugby ball using spin as well as how they should twist their bodies when doing so.

T: So if I go on the left, I can use a one-hand spin pass, or two-hand to direct to where I want it to be. And you can see how our legs are moving. If we are going this side, we will actually shift our legs so that we will have a wider range and if we go on the right, we will actually shift our legs as well.

6.3 Clarifying/Explanatory Talk

Explanatory talk is a form of understanding talk in which the teacher/student give reasons or explanations for the initial statement (“Susan: why do you think that?” “Richard: what evidence do you have for that claim?” How did you arrive at that conclusion?” “I think this because”), or asks students to evaluate the adequacy or strength of another student’s statement (“Jennifer: do you agree or disagree with what Helen has said and why?” “Paul: How strong is Peter’s explanation or reasoning?”). Explanatory Talk incorporates an element of Q & A thus, detailed explanation on part of the teacher does not count as Explanatory Talk; it involves clarification/negotiation of meaning. Giving reasons might take a variety of forms, e.g., giving a description, giving evidence, making connections, giving a justification. Not all explanatory talk is what Michels and Reznick term “talk that is accountable” (**accountability talk**) to the standards of “rigorous thinking” or reasoning in which the teacher emphasises the importance of “logical connections and the drawing of reasonable conclusions.”

As before, it is quite likely that you will encounter many lessons in which teachers couple explanatory talk with other forms of knowledge talk. Teachers/students will often conjoin explanatory and procedural knowledge (as when a student attempts to explain their solution to a problem by describing the procedures or algorithm they used to generate the solution), in which case coders should code for both Explanatory and Procedural Talk.

Whenever Explanatory Talk is coded, consider if Conceptual Knowledge should be coded.

Protocol:

1. Look for a clarifying, probing question either from T or S. The question indicates the start of a possible Explanatory Talk
2. Code for Explanatory Talk if the Question occurs and there is an exchange between T/S or S/S that leads to an elaborated explanation, clarification or negotiation of meaning.
3. Code for Student Extended Response if the elaborated explanation is generated from the Student

This means that Explanatory Talk refers to explanations that can be generated from either the student or teacher. However, we can filter (via Student Extended Response AND Explanatory Talk) to isolate only Student-generated explanations or Teacher-generated explanations.

Only code for explanatory talk when it is preceded by a question prompting an explanation. Do not code when teacher is merely providing an explanation as part of an exposition.

Examples:

- *Teacher asks, “Susan, why do you think Jaime decided to use a bounce pass to pass the ball to Kelly?”*
Student replies, “Because Daniella was too tall and it was too hard to do an overhead pass to her. She was also in between Kelly and Jaime, which did not allow her to throw a chest pass. That is why the best option was to do the bounce pass around Daniella.”

P5 Example: S2T5 L3 Int 6 (Tchoukball)

T: Why do you think I put the additional rule of one second that you need to release the ball?

S: You’re training us to pass quicker and dodge the defender.

T: Pass quicker means you have to think quicker. Exactly, it is not just about having somebody in the middle and making them run. It is about thinking fast. Once the ball is in the air coming to you, you must already start planning who you are going to pass to. Because that one second is going to go past very fast.

S3 Example: S60T11 L5 Int 8 (Softball)

T: Student A, that was a good shot. How did you feel about the swing?

S: Bad.

T: Why? Why bad?

S: I feel like it didn't go high. Because I realized that my follow through would mess up everything because sometimes I would stop here.

T: So you are used to stopping halfway?

S: Yeah, I think so. So just now I tried following through but I don't know whether it is correct or not.

6.4 Temporal Connections

When the teacher and/or student(s) make connections to earlier discussions in the current lesson, or to previous lessons or units, or to lessons or units that will come after the current lesson, code for temporal connections. Note here that a superficial reference to a past or future lesson is not sufficient (and is coded under Organisational Talk). Instead, there should be evidence that the teacher and/or student(s) not only refers to the past/future lesson but explains why the temporal context of the lesson is important to understanding the current lesson's content. E.g., "Remember last week we learned about linking words? Today, we look at linking phrases" is Organisational Talk and not Connecting Talk. But if the teacher added "Such phrases have the same idea as words because they join clauses, sentences and paragraphs together but they are used to develop coherence, linking one idea or argument to another. Good use of linking phrases and words will make your essay easier to follow but bad use will make it disjointed, too many short sentences, difficult to follow your line of reasoning" would be coded as Temporal Connecting Talk.

There will be occasions when the teacher/student will make temporal connections and engage in framing talk (see below): when that happens, don't try and decide which one is the dominant form, but simply code for both.

Code for Conceptual Knowledge whenever Temporal Connecting Talk is coded.

Examples:

- *Teacher: "Remember last lesson where we learnt about the different forms of passing? You need to know when to use each form of passing in order to achieve the aim of what your objective is. If you want to move quickly up the court, the*

chest pass would be one of the fastest ways to achieve that aim. However, if there are defenders between you and your teammates, then the other forms of passing would be more beneficial.”

P5 Example: S12T5 L1 Int 9 (Badminton)

T: Just now, we were doing the first activity, which was the juggling. We have established that some people are ok with the low height but the majority of us prefer the high height of the shuttlecock and you can have a longer reaction time for you to adjust your bodies.

S3 Example: S50T7 L1 Int 1 (Touch Rugby)

T: So if you recall, what did we do the last lesson?

S: Captain’s Ball.

T: Captain’s Ball. What else did we do?

S: Molecule.

T: The molecules with the rugby tag, right?

6.5 Conceptual Connections

Here the teacher asks students to make, or students themselves initiate making, connections between concepts (e.g., nouns and verbs, or adjectives and nouns), between representations, between examples/analogies, between examples and concepts, between arguments and counter arguments, between examples and counter examples, between non-curriculum (out-of-school) ideas and curriculum ideas. Students could also be asked to make comparisons between ideas or concepts and to explain such differences. E.g. “Good, have you considered X?” “Is X an example of what you are doing or saying?” “How are X and Y the same but different?” “If you changed X in your statement (where X is one element in the statement) would you get the same result or meaning?” “What if you changed X to Y?” “What other solutions are there to this problem?” “Could we solve this problem differently?” “Is it possible to improve, expand or build on this solution/statement/argument in some way?” “Can we represent/state this problem differently?” Critically, students can also engage in conceptual connecting talk and should be coded accordingly.

Code for Conceptual Knowledge whenever Conceptual Connecting Talk is coded.

P5 Example: S11T5 L2 Int 2 & 3 (Softball)

Teacher is teaching students about the importance of throwing the ball properly (in Softball). After receiving some answers from the students, he links the topic to Baseball to highlight the similarities and explain why it is important to throw quickly and accurately.

S3 Example: S51T9 L1 Int 1 (Netball)

T: Ok, I'm going to show you three kinds of pass that you have seen in other sports, that we played in Softball, Basketball. Can you identify the three kinds of pass for me?

6.6 Framing Talk

Framing Talk is a form of connecting talk typically undertaken by the teacher when s/he steps back from an ongoing conversation to frame, interpret, situate the classroom talk not at a topical level, but in a broader conceptual, procedural or epistemic context. Here the connection is between talk and context. It thus goes beyond simple recapitulation: whereas recaps merely restate what the teacher has been saying at the topic level, framing talk attempts to situate the discussion in this broader context. E.g., “So what we’ve been talking about is this”, “Now let’s take a moment to think about what we’ve done so far. You have selected and discussed your project proposals but can you see how this is not a simple task, that how you choose your topic whether it’s conservation or animal protection or climate change affects your access to resources, people you need to interview, archives, places you have access to. What I am saying is that you need to think carefully, when you discuss with your project mates, what challenges there are when you choose your specific topic. Just because it’s your pet topic doesn’t mean it’s the best topic to work from.” An indicator that Framing Talk is occurring is that the teacher usually begins with the talk with an utterance that asks students to hold their thoughts, to metaphorically step back from their discussion, to take a moment to look at or think about the bigger picture. E.g. “Let’s think about this”, “What have we been talking about, we’ve been talking about X”, “Lots of ideas flying around, let’s take a moment to consolidate.”

In Framing Talk then, the teacher (generally) is trying to make transparent or visible the nature and direction of the learning journey the students have been engaged in. Very often though Framing Talk will overlap other forms of talk, for example, Procedural

Talk (when the teacher is just talking about procedures e.g., “Now do you see what we are doing here, in order to find equivalent ratios, we either divide or multiply the numbers by a single factor”), Temporal Connections and Conceptual Connections, as teachers attempt to weave a richer narrative about the nature, meaning, location and value of the topic in hand.

Note that students can also engage in framing talk and should be coded accordingly.

No examples observed for P5.

Possible example for P5: (Hypothetical)

Teacher speaks to the class and says: “Ok, so far, we have learnt that everyone gathering together is not good. What I want you to try now is to spread out and try to maximize the space you have so that you have more options and the defenders will find it harder to defend against you since you will have more space to move around.

S3 Example: S58T8 L6 Int 5 (Basketball)

T: So, the teaching point here, the defender in the middle...must move forward. If the defender doesn't move forward, it is very hard for the defender to do a fake.

6.7 Reframing Talk

Reframing talk is talk that moves back and forward between vernacular talk and more abstract, technical, domain-specific disciplinary talk. In this sense, it is conceptually different from “Framing Talk” above. The focus here is between two distinct types of talk or grammars (vernacular and technical), but typically within the same subject domain or discipline. Generally it is purposively orchestrated by the teacher in order to enhance the ability of students to translate their ordinary everyday understandings into more abstract, technical and generalisable language distinctive of disciplinary talk. Or vice versa. In general, we would expect an effective teacher to work backwards and forwards between vernacular and technical talk in order to ensure that students’ prior knowledge and understandings are engaged, made explicit and challenged: if these are not engaged and challenged, it is hard for students to develop new conceptual understandings of the topic.

Providing students access to technical or formal disciplinary language is important because it gives students access to the rich (and far more precise and powerful)

conceptual resources of disciplinary knowledge. Without access to these conceptual resources, it will be hard for students to engage in more complex forms of knowledge work demanded by the curriculum.

Note that vernacular talk is often linked with commonsense, every day, spoken language, while technical talk is manifested in both spoken language and written language (Gibbons, 2003).

There are a number of common moves that teachers use to press students' vernacular talk towards technical talk:

- a. Recasting students' everyday terms (e.g., “stuck to each other”, “line”) to more formal terms (“they attracted to each”, “chord”). Such recasting and extension of student-initiated meaning depends on the teacher's contribution being closely related to, and thus following, the student's contribution. Note that implicit teacher recasts (i.e., recasts that simply reformulate all or part of the student's utterance with no additional meaning and without drawing student's attention to the reformulation) minimise the value of student's utterances, for such results do not require students to adjust what they have said.
- b. The teacher may make the move towards technical talk more explicit by signaling to the students how to reformulate, or by inviting student-, rather than teacher-, generated repair (ie indicating a need for reformulation). The teacher may signal how to reformulate by providing the student with points on how to reformulate her own wording, such as a request for clarification which may result in increasingly explicit and more abstract information from the student. Or the teacher may ask a question designed to elicit additional information from a student. In these instances, the student's language is being stretched.
- c. Vernacular talk is also often based on a student's personal knowledge or experiences, while technical talk is based on a body of disciplinary knowledge and the language that is used to express that knowledge. As teachers move between vernacular and technical talk, the overall direction should always be towards technical talk, as that is “academically valued” talk that is needed for students to achieve their academic outcomes.

Code for Weaving - Technical/Commonsense whenever Reframing Talk is coded.

NOTE: Reframing talk is not just about replacing words with synonyms. If you encounter a situation where you think the replaced term may or may not be a technical term (ie it could be a synonym) then do not code for Reframing Talk.

P5 Example: S12T5 L9 Int 1 (Badminton)

T: In the game, there will be alternate serving. Meaning King serves, challenger serves. King serves, challenger serves. King serves, challenger serves. It doesn't matter who gets the point. You take turns to serve. When you serve, it will be diagonal court rule. That means, if you are starting your service on the right side of the court, you must send your shuttlecock to the left side of the court. Diagonal. If you send it to this side, the right side, your opponent gets the point.

No examples observed for S3.

Possible example for S3: (Hypothetical)

Teacher is teaching the students about the correct movements to get around the defender in Touch Rugby.

T: So what do you do when you are faced with the defender?

S: I would step to the side or move backwards.

T: Ok, good. You can side-step the defender or backpedal. This way, you can avoid him for a bit longer and decide what you want to do with the ball.

6.8 Justification Talk

Justification talk is a form of understanding talk in which the teacher discusses or asks students to identify and discuss the domain specific epistemic norms (criteria and standards) to be used to establish the truth value, rigor, validity, reliability, authenticity, aesthetic quality or reasonableness of a knowledge claim (“Peter, how would you know whether that statement is true or not?” “Is there sufficient evidence to believe X is true?” “What makes this a reasonable claim?” and students attempt to do so. In science, justification talk focuses on the reliability and validity of the evidence (data) used to establish the truth value of a statement or knowledge claim. Although close to explanatory talk, justification talk is different from explanatory talk in that it focuses not on the causal argument as such but on the criteria and standards we use to evaluate the adequacy of the causal argument (or any other kind of argument).

NOTE: Justification Talk emphasises the disciplinary or epistemic norms and standards, so code for Justification Talk only when such norms/standards are discussed. In Arts, whenever Justification Talk is coded, consider whether Explanatory Talk and Conceptual Knowledge should be coded.

P5 Example: S11T5 L5 Int 4,5 (Softball)

T: The reason why I choose this cone to hold the ball, it is because the ball would be between the knee and shoulder. In an actual game of softball, they will have a ball that they will throw underarm and when they throw, there is a requirement.

Then the teacher demonstrated with another student what the requirement was.

T: When you pitch the ball to this person, it has to be between the shoulders and the knee. This is to ensure that the person batting the ball can bat it.

No examples observed for S3.

Possible example for S3: (Hypothetical)

T explains that if the attackers stand still, defenders can just stand in front of them to block the pass. However, if they were to move around behind them, it would distract or make it more difficult for the defenders to cover all the space.

The teacher then explains that the attackers need to open up passing lanes and find space for themselves so that their teammates can pass them the ball successfully.

6.9 Reflexive Talk

Reflexive talk is a form of talk that focuses on meta-cognition and self-regulation: how individual students learn, or can learn, to manage their own learning more effectively. Teachers might occasionally talk about this in a whole class discussion, but it's more likely to arise when a teacher talks to an individual student. For example, when a teacher asks a student "How did you go about learning that?" or "What have you found the most effective way of learning something (or something like this)..." or "How do you think you could improve your learning of this topic?", the teacher is asking meta-cognitive questions.

Code for Metacognitive Knowledge Focus when Reflexive Talk is coded.

Larkin (2010) coded teachers' metacognitive behaviours in classrooms and gave examples of questions that lead students to 'think about thinking':

T refers to self learning strategies	"What could you do if you've got problems?"
T asks how S acquires knowledge	"How do you know that?"
T seeks further information	"What are you going to do now?"
T questions, comments on, or asks for explanation of strategies	"Why did you do it like that?"
T asks for predictions of success	"Do you think will this work?"
T asks Ss to show expectations of planning	"How are we going to do this, what do we need to think about?"
T expects Ss to check	"Check what you are counting in?"
T refers to own cognitive processes	"I don't understand it either"
T refers to cognitive processes in general	"We all need to think really hard about this"
T refers to universals of cognition	"We are going to solve a problem"
T prompts evaluation	"Was it difficult to do or was it easy?"

These teacher questions are seen as facilitating metacognition because they ask questions that require one to think not about the solution to a problem but about how to get to that solution. They also include prompts to reflect on feelings of knowing or to become conscious of thinking.

Larkin (2010, p. 110) cautions that the utterance must be seen in its context, rather than taken in isolation:

Sometimes it is only clear from the context of the individual speech act that the teacher is engaging at a metacognitive, rather than a cognitive, level. For instance, a simple question taken in isolation such as "How did you do that?" could be referring to the cognitive strategy used to solve a problem and the answer might be "We put the biggest here and the smallest here." But "How did you do that?" could also be metacognitive if it refers to a metacognitive strategy. In this sense the question is a short form of asking

“How did you know how to do that?” This may get an answer referring to past knowledge or to an analogy – “Because it’s the same problem as the sticks” – or a more general answer – “I had to think about it and decide how to organise it.” (my italics)

Drawing on the previous paragraph, the emphasis of Reflexive Talk is on student learning and not on task performance. The exchange should lead towards the surfacing of student learning. The teacher might ask questions that are potentially metacognitive in nature (so we would code for Metacognitive Knowledge) but if the student uptake and subsequent interaction is not related to student learning, we do not code for Reflexive Talk

1. Teacher asks a metacognitive question
2. Student response might not be metacognitive, in which case T might follow up with further questions that facilitates metacognitive responses from S, i.e., the focus of the interaction is on student learning processes rather than on task performance
3. We then code for Reflexive Talk as well as Metacognitive Knowledge

Larkin also provided codes for children metacognitive behaviours, although given that her focus is on young children, these should be taken as heuristic rather than definitive.

Shows knowledge of self in relation to cognition	“I know what to do”, “I know I am good at writing”
Refers to what others think/desire	“She doesn’t know how to do it”
Refers to universals of cognition	“We’ve got to solve a problem”
Questions task information	“Something is missing, it doesn’t make sense”
Predicts success/failure	“We’ll be done in just a minute, if we do this”
Refers to ease/difficulty	“This is so hard to do”
Compares with other tasks	“This is just like the problem with the stairs we did last week”

Refers to planning the task	“We need to know which way to go round the table, we need to talk about it”
Paraphrases to confirm understanding	“Did you mean...?”
Asks a question of self	“I think that’s right, but is it?”
Checks work	“This one’s good, this one’s not”

Note: Reflexive talk (6.9) is coded when we code for Metacognitive knowledge (5.7).

Example:

- *Teacher asks a student, “What did you do wrong when you tried to improvise? How do you think you could have improvised better?”*

P5 Example: S11T5 L2 Int 4 (Softball)

T: What are some of the things that helped you in passing faster?

S3 Example: S54T11 L5 Int 10 (Floorball)

At the end of the lesson, the teacher asks the students how many of them can tell him the factors that determined whether they won or lost. The students gave him answers such as coordination, skill, speed, luck, enemy goalkeeper.

T: That is why every team that comes out, I will ask you all the same question. What are the things that you did right and what are the things that you did not do right. And these are the things you need to ask yourself, not just for Floorball, but for anything that you do, including your group project, including your studies also.

6.10 Performative Talk

Performative talk is an aspect of Epistemic Talk, and is qualitatively different from Assessment Organisation Talk. Performative Talk is more substantive, with explicit references or links to assessment outcomes. It uses performance outcomes as the rationale for the talk. Performative Talk includes instances in which the teacher refers to marking criteria, deduction of marks etc. in the absence of a specific examination context. E.g. “These are basic minor things the examiner will look at and it will cost you marks”; “You will get marks for providing suitable evidence even if you are not

able to explain very clearly”; “To score in a question like this, I suggest split your answer into two parts.”

Note that Performative Talk can be coded with either Factual Knowledge or Procedural Knowledge. The difference is that Performative Talk-Factual Knowledge focuses on knowing what to do to improve or score better, while Performative Talk-Procedural Knowledge focuses on knowing how to improve or score better eg through the use of some heuristic like PEEL or Polya’s SMART/UPDC to ensure their solutions are correct.

P5 Example: S12T5 L7 Int 10 & 11 (Badminton)

T: Student A, just now the shuttlecock was there (in front of her), just step back and hit it.

No examples observed for S3.

Possible example for S3: (Hypothetical)

During a Softball lesson, the teacher tells the student that he needs to bat the ball away from the fielders in order to get on the base and increase his chances to score a run.

Unlikely to see performative talk in PE as the subject does not have formal assessment, especially if we do not consider game performance to constitute assessment.

6.11 Epistemic Virtues Talk

Epistemic Virtues talk is evident in the classroom when teachers attempt to inculcate in their students epistemic, knowledge orientation or disciplinary virtues. Such virtues are necessarily embedded in specific epistemic or disciplinary contexts or references epistemic or disciplinary standards. The contexts or standards might be implicit/implicit and not explicitly referenced by the T.

E.g., “Always remain receptive to new ideas and different perspectives”; “Don’t take issues at face value, learn to view things with a critical eye; “When quoting someone’s thoughts or words, clearly acknowledge the source or you’ll be guilty of plagiarism”; “Have conviction in your standpoint; but readily accept your mistakes in the face of better reasoning.”

In contrast, Values Talk focuses more on general moral or learning dispositions. What distinguishes Values Talk is the absence of the academic/disciplinary contexts or

standards, i.e., it is a general talk about certain morals or values. If the T flashes on the screen a set of values (be respectful in class) but without reference to the academic/disciplinary context/standards, then this is coded as Values Talk. T may often make statements such as “practice makes perfect”, “you must be hardworking” etc, but these are largely Values Talk unless the academic/disciplinary contexts/standards are referred to.

Listen to the talk that happens before the moral/values/virtues and if the T links it to (e.g.) some mathematical process or disposition, then it is Epistemic Virtues Talk.

Example: T makes a reference to a mathematical process (you must write the % symbol consistently or else you will forget) and then says, "practice makes perfect". The practice disposition is linked to a mathematical understanding of the importance of symbols and hence is an epistemic virtues talk.

Some virtues are:

- Truth telling, honesty
- Truth seeking
- Curiosity
- Imagination, creativity
- Integrity
- Objectivity
- Open-mindedness
- Perseverance
- Responsibility
- Intellectual courage
- Criticality
- Logical, rigorous, careful, meticulous
- Being reasonable: being responsive to evidence, good reasons

Example:

- *Teacher tells a student, “Don’t be afraid to try different strategies and experiment when playing.”*

P5 Example: S4T5 L5 Int 9 (Tchoukball)

T: Anything for me for Tchoukball? No? Now the lesson is over, the next thing is to practice and refine the skills. Where you stand, the position, how you shoot. Just now, I saw that there are some good shooters and some good catchers.

No example observed for S3.

Possible example for S3: (Hypothetical)

Teacher talks to the students about showing integrity when playing a game of Football and links it to gamesmanship.

6.12 Values Talk

Values talk is evident in the classroom when teachers talk about values in a non-academic/disciplinary context:

- Respect
- Responsibility
- Resilience
- Integrity
- Care
- Harmony

These values guide students to discern between right and wrong, help them to make responsible choices and become more aware of their role in society.

NOTE: We code for Values Talk when there is a T utterance or discussion, not only of the specific values, but any justification of why those values are important or needed.

We can also code for Values Talk if the T talks about certain classroom norms (“raise your hands when you want to speak”) *and* provides some justification of why the norm is important or necessary.

Example:

- *Teacher tells a student, “You should not taunt your opponents, even if you are better than them.”*
- *Teacher tells a student, “Work together as a team!”*

P5 Example: S12T5 L9 Int 12, 13 & 14 (Badminton)

Teacher talks about the values the students have learnt during his lesson. He mentioned how the students already knew to shake hands and say “good game” after they finished their games against each other. He also mentioned that the umpires were decisive in their decisions and that they respected each other.

S3 Example: S52T10 L4 Int 2 (Volleyball)

Teacher scolds a student who kicked the volleyball towards another student. He spoke to the student about the right way to pass the ball, about having social awareness, control over himself, and that safety was his concern during the lesson.

7 WEAVING

Weaving is the systematic connection making (by teachers and/or students) between different types of knowledge, different time spans, and different fields of knowledge (disciplinary, contextual, spatial), as they are systematically built up towards complex knowledge larger than its component forms (Kwek, 2014, see Courtney Cazden’s original description on weaving below). Different activities or examples (such as everyday/ commonsense examples or science experiments) may be used to build up knowledge but the teacher or students explicitly makes the connections between such examples/activities and the target knowledge (concept, idea).

Weaving facilitates a long-term building up of specific kinds of knowledge, constructing “complex patterns (understandings) *towards a rich, coherent whole – qualitatively different from, and more significant than, the sum of its separate threads*” (Cazden, 2005, p. 21, my italics). The hypothesis about the power of weaving is that a focus on “explicit classroom attention to the relationships among kinds of knowledge will contribute to the awareness and control that, in turn, will support such hoped-for-goals of educational reform as creative thinking and innovative problem-solving” (Cazden, 2005, p. 24). This is possible because weaving is a cognitive “activity of potential knowledge generation and critique” (p. 21). In Cazden’s own words:

First, it can contribute to the public voicing by students, and the equally public validation of relevance by the teacher, of students’ more local, common sense, ideas and identities from their individual and personal or social and cultural experiences. In short, *weaving makes connections by building on and*

transforming the familiar. Second, weaving should support students in understanding relationships of similarity and difference between the known and the new – understanding that is essential, according to current learning theory (Bransford et al 1999) for the deepest understanding and most flexible use, including reasoned critique, of the official school curriculum. In short, it *contributes to unlocking and making accessible the unfamiliar*. (Cazden, 2005, p. 21, my italics)

Conceptual Weaving

There are instances when weaving may occur across phases rather than within a phase, which should be expected of teaching making numerous connections. In such instances, code for weaving at the phase when it occurs, and at the same time code for weaving to previous weave, hence indicating a sustained sense of connection making by the teacher. Whenever conceptual weaving is coded, code for Conceptual Knowledge and Conceptual Connections Talk.

Scale:

0 or 1 = Technical/Theoretical/Scientific ↔ Commonsense/Practical/Everyday

0 or 1 = Local/Individual ↔ Global/Society

0 or 1 = Literal/Concept ↔ Metaphor/Analogy/Example

0 or 1 = Concept ↔ Macro/Larger Concept/Contrasting Concept

0 or 1 = Others

7.1 Technical/Theoretical/Scientific ↔ Commonsense/Practical/Everyday

When teachers or students make connections between commonsensical knowledge and its more abstract, technical equivalent, or when teachers or students make connections between theoretical concepts or ideas, and their practical applications or ideas, or when teachers or students make connections between scientific concepts and everyday concepts or ideas. When this is coded, “Teacher relates concept/topic to everyday life” should be coded as well.

Note: coded with visible learning (3.4)

P5 Example: S5T5 L1 Int 1 (Floorball)

T: What makes a good dribble?

S: Keep the ball close to you.

T: Now I'm not sure who watched Brazil vs Mexico game. You watched Neymar or not?

The way he dribble, it is like the ball sticks to his leg. A good dribble makes a lot of difference. To make a good dribbling, the ball must be close to your sticks.

S3 Example: S52T10 L4 Int 2 (Volleyball)

T: How is the trajectory of the ball? Not high enough right?

S: Need to go higher.

T: Why need to go up?

S: So that he has more time to hit the ball.

7.2 Local/Individual ↔ Global/Society

When teachers or students make connections between local knowledge (e.g., Singapore geography) and global knowledge (e.g., Environmental issues at G8 summits), or when teachers or students connect what they know about individuals or selves with societal or community issues or matters.

No examples were observed for P5 and S3.

Possible example for P5 and S3: (Hypothetical)

Teacher is highlighting the benefits of working together as a team and expands on it to include how citizens of countries can work together as well to benefit each other.

7.3 Literal/Concept ↔ Metaphor/Analogy/Example

When teachers or students make connections between metaphorical or analogical concepts or ideas, and their literal equivalents. An example would be a teacher talking about cells (literal) in terms of Lego bricks (metaphor), or society (literal) with ant hills (analogy).

P5 Example: S12T5 L3 Int 1 (Badminton)

The teacher used physical examples of where the ball needs to be pitched to fulfill the rules of pitching in an actual game of softball.

S3 Example: S51T9 L5 Int 11 (Netball)

T: One thing I've noticed is that most of you do not stick to the one you are guarding. For example, GD is not guarding GA because you are like honey and bees. Your ball is the honey and all of you flock to the honey. All of you are like bees. You flock to the ball instead of sticking to your partner.

7.4 Concept ↔ Macro/Larger Concept/Contrasting Concept

Teachers or students make connections between a current concept with a larger concept or idea, or a contrasting concept. Example would be the concept of housing connected to the larger idea of physical environment (concept – larger concept) or concept of war to concept of peace (concept – contrasting concept). Note that when this occurs, “Comparing and Contrasting Information/Knowledge” should be coded as well.

P5 Example: S11T5 L2 Int 2 & 3 (Softball)

Teacher is teaching students about the importance of throwing the ball properly (in Softball). After receiving some answers from the students, he links the topic to Baseball and describes how throwing quickly can help their team win the game by outing the runners on the opposing team.

S3 Example: S58T8 L1 Int 4 (Basketball)

Teacher instructs students to engage in an activity that focuses on the concepts of passing and moving using basketballs.

7.5 Others

This category includes instances of weaving not easily captured by the categories above.

No examples were observed for P5 and S3.

Field Weaving

Weaving is not just about different forms of knowledge but can occur between different disciplines, contexts or texts/genres. For example, a teacher might be weaving between scientific and everyday biological concepts, and then weaves such concepts with another discipline such as chemistry. Or a teacher might weave between new and

known concepts in social studies as an abstract subject and a real world context (e.g. racism in the workplace).

Note that conceptual weaving can occur without field weaving, which suggests single disciplinary weaving or within specific contexts.

7.6 Disciplines

Making connections between disciplines.

0 or 1 = Weaving between different disciplines.

No examples were observed for P5 and S3.

Possible example for P5 and S3: (Hypothetical)

Teacher makes a connection between swinging a softball bat and physics by talking about how the movement of the hips generate the power when swinging the bat.

7.7 Contexts

Making connections between different contexts (such as countries, situations) or to earlier discussions in the current lesson, or to previous lessons or units, or to lessons or units that will come after the current lesson [Extracted from Temporal Connection Talk definition].

0 or 1 = Weaving between different contexts or time. The key here is the comparative thinking required as students weave between contexts.

P5 Example: S11T5 L2 Int 2 & 3 (Softball)

Teacher is teaching students about the importance of throwing the ball properly (in Softball). After receiving some answers from the students, he links the topic to Baseball and describes how throwing quickly can help their team win the game by outing the runners on the opposing team.

S3 Example: S50T7 L1 Int 1 (Touch Rugby)

T: So if you recall, what did we do the last lesson?

S: Captain's Ball.

T: Captain's Ball. What else did we do?

S: Molecule.

T: The molecules with the rugby tag, right?

7.8 Texts

Making connections between different texts or genres (intertextuality).

0 or 1 = Weaving between different texts or genres (i.e., intertextuality). E.g., teacher weaves between a poem and a love story to talk about the concept of ‘struggles of love’.

No examples were observed for P5 and S3.

Possible example for P5 and S3: (Hypothetical)

Teacher makes connections between two different books on sports/sport personalities. (Highly unlikely to be observed as the emphasis is on student activity, rather than discussion)

8 EPISTEMIC PLURALISM AND DELIBERATION

Good knowledge work is characterised by epistemic pluralism or openness – or, to put it negatively, by the absence of “epistemic closure.” Epistemic pluralism accepts that there can be multiple perspectives on an issue or multiple solutions to a problem. However, good knowledge work also insists that epistemic pluralism be principled rather than promiscuous or lacking in discrimination – perspectives or solutions have to be well grounded, publicly justifiable and accountable to the knowledge community.

We know from Core 1 that in a very large proportion of Singapore classrooms, knowledge claims are presented as truth claims – claims that are true per se—rather than as contestable claims to be settled by evidence, reasons, arguments, comparison, discussion etc. In this scale, we want to explore this issue again, but keeping additional considerations in play as well. Consequently, for each phase, we will code for five features of knowledge claims made by the teacher and/or students:

- Is the knowledge claim presented as **truth** or as a **contestable** claim? If the knowledge claim is presented as a contestable claim, we have an instance of epistemic agency. (Note: Cazden’s comment in Mercer and Hodgkinson on the exercise of epistemic agency in the right to offer alternative

accounts, explanations. Epistemic agency is characteristic of exploratory or understanding talk).

- Is the knowledge claim supported by **reasons** (evidence, arguments, justification) or not? If not, it is an expression or statement of opinion rather than a knowledge judgement.
- Does the attendant knowledge talk permit or encourage **knowledge critique** i.e., students are encouraged or permitted to question the validity of the source or knowledge claim?
- Are students encouraged to **compare and contrast** knowledge claims, and to assess the relative strength of alternative perspectives or knowledge claims?
- Who are the **epistemic agents** involved in making knowledge claims: the teacher, individual students, the whole class or small groups in the class?
- Is the **epistemic value** of the knowledge claim dependent on the epistemic status of the epistemic agent making the knowledge claim (teacher, student)?
- Is the knowledge claim made after **collective deliberation** or not i.e., the epistemic agents discuss the reasons or evidence for a knowledge claim?

Epistemic Orientation (Whole Class)

8.1 Knowledge as a Contestable Claim

Is knowledge presented as the (incontestable) truth or as a contestable claim that can in principle be validated or supported by evidence, argument, justification, comparison?

8.1.1 Knowledge Claim Supported by Reasons

Knowledge claims are supported by evidence, argument, agreement, justification, and comparison.

Scale:

0=No (No reasons provided to support knowledge claim)

1=Yes (Reasons supplied to support knowledge claim)

No examples were observed for P5 and S3.

Possible example for P5 and S3: (Hypothetical)

During a lesson on Softball, the teacher tells the students that hitting the ball along the ground can be a viable strategy as well. A student challenges him by asking “How come? When the ball is low, it’ll be easier for the fielders to catch the ball and send you out.” The teacher replies by saying “If the fielders do not expect it, they may be spaced out too far or be surprised by your low ball, allowing you the chance to sneak a score in.”

8.1.2 Knowledge Critique

Students are encouraged to question the validity of a source or the claims made by teacher, text or knowledge source.

Possible indicators of *Knowledge Critique*: tasks that require students to

- engage in critical thinking
- analyse the soundness and strength of an argument, explanation or description
- deconstruct and analyse texts for contextual, textual and stylistic merits
- carry out self- or peer-evaluation of student texts
- evaluate the reasonableness of the writer’s intentions
- assess the quality of work based on established criteria

Scale:

0=No (no evidence of knowledge critique)

1=Yes (some evidence of knowledge critique)

No examples were observed for P5 and S3.

Possible example for P5 and S3: (Hypothetical)

During a lesson on Football, the teacher and students go through a video summary of how Marcelo Bielsa’s Leeds United team play to analyse and evaluate Bielsa’s preferred style of play and how it compares to other managers.

8.1.3 Comparing and Contrasting Knowledge

Students are encouraged to compare and contrast the epistemic strengths, reliability, rigour of alternative approaches to a problem or knowledge source.

Possible indicators of Comparing and Contrasting Knowledge: tasks that require students to evaluate

- the similarity and differences in textual features
- the strengths and weaknesses of different arguments, explanations and descriptions
- the classification and categorising of information in order to draw conclusions or justify responses

Scale:

0=No (no evidence of comparing and contrasting)

1=Yes (some evidence of comparing and contrasting)

No examples were observed for P5 and S3.

Possible example for P5 and S3: (Hypothetical)

In pairs, students are to develop strategies and moves to get past their defenders, according to the criteria given by the teacher. They are then to compare and discuss their ideas.

Epistemic Agency (Time based)

Who is the author of the knowledge claim? Does the teacher exercise epistemic authority in the classroom? Are students epistemic agents in the classroom? Does the teacher permit or encourage collective deliberation of the knowledge claim?

8.2 Teacher

Example in 8.1.1 indicates the teacher as an epistemic agent.

8.3 Teacher/Student

Examples in 8.1.2 & 8.1.3 indicate both the teacher and students' collective deliberation of the knowledge claim.

8.4 Student

Example in 8.1.2 indicates a student as an epistemic agent.

Code 0 or 1 for the dominant agency (Time based).

9 STUDENT ENGAGEMENT

Student engagement refers to the level of engagement or participation each PE class has with the activity assigned to the present session. It also tracks the period of time the students are actively engaged with the activity.

9.1 Percentage (%) of Class

Students have to be physically engaged in the activity to be considered engaged (i.e. waiting in line or if sitting by the sidelines as a substitute means that they are NOT engaged). If there are different levels of engagement in the phase, then code for the one which takes place for the longest duration (if too close to differentiate, then take the highest)

9.1.1 No Student Engagement (0%)

P5 Example: S2T5 L1 Int 2 (Tchoukball)

Students were sat down in front of the teacher as they listened to his exposition regarding the lesson for the interval.

S3 Example: S51T9 L1 Int 1 (Netball)

Students were sat down in front of the teacher as they listened to her exposition regarding the lesson for the interval.

9.1.2 Low Student Engagement (<50%)

P5 Example: S2T5 L1 Int 1 (Tchoukball)

Students took turns run up and down the court in a relay as a warm up.

S3 Example: S51T9 L1 Int 2 (Netball)

Students lined up and waited their turn to do chest passes with the ball to each other.

9.1.3 Medium Student Engagement (50% - 65%)

P5 Example: S5T5 L1 Int 5 (Floorball)

In a practice session, only two out of the four students per group were actively involved in the activity at one time.

S3 Example: S51T9 L1 Int 2 (Netball)

The class is split into groups of 5 and are practicing passing the ball to each other with one student playing the monkey in the middle.

9.1.4 High Student Engagement (65% - 100%)

P5 Example: S2T5 L1 Int 3 (Tchoukball)

All the students took part in the Tchoukball game.

S3 Example: S51T9 L7 Int 7 (Netball)

More than 65% of the class took part in the Netball games as there were two concurrent games running with some students sat on the sidelines as substitutes.

9.2 Percentage (%) of Time

This refers to the percentage of the interval in which the students are engaged with an activity, based on the criteria above. Do not code for this if NO student engagement is coded previously.

9.2.1 Low Student Engagement (<50%)

P5 Example: S2T5 L2 Int 1 (Tchoukball)

The students only took part in the activity for less than 2mins and 30secs.

S3 Example: S50T7 L1 Int 1 (Touch Rugby)

The students only took part in the activity for less than 2mins and 30secs.

9.2.2 Medium Student Engagement (50% - 65%)

P5 Example: S2T5 L2 Int 2 (Tchoukball)

The students only took part in the activity for between 2mins and 30 secs to 3mins and 15secs.

S3 Example: S50T7 L1 Int 1 (Touch Rugby)

The students only took part in the activity for between 2mins and 30 secs to 3mins and 15secs.

9.2.3 High Student Engagement (65% - 100%)

P5 Example: S2T5 L2 Int 6 (Tchoukball)

The students took part in the activity for more than 3mins and 15secs.

S3 Example: S50T7 L1 Int 1 (Touch Rugby)

The students took part in the activity for more than 3mins and 15secs.

10 ACTIVITY SETTING

The aim of MOE is to teach PE using a game-centered approach, which means that the emphasis of the lessons should be allowing students to play the games and then build up what they don't know through teaching and drills. As such, there is value in differentiating between drill and game settings for the activities organized for the PE lessons.

10.1 Warm Up

When coding for Warm-ups, do not code for practice. Only indicate whether it involves individuals or pair/group work. Warm-ups do not include practicing of skills relevant to the topic of the lesson.

P5 Example: S2T5 L2 Int 1 (Tchoukball)

The students took part in a warm-up activity, which involved running a relay across the court.

S3 Example: S53T11 L1 Int 1 (Floorball)

The students took part in a warm-up activity, which involved a slow jog three rounds around the hall.

10.2 Drill Setting

Drill Setting tends to involve isolated skill activity or a repetition of individual skill in a rigid pattern. Code for Practice (1.17) if coding for drill setting.

P5 Example: S12T5 L6 Int 1, 2, 3 & 4 (Badminton)

Teacher has the students practice moving to the front of the court and backpedaling to the back of the court to simulate the correct movement when playing Badminton. He also incorporated a lunge to further emphasize his point.

S3 Example: S51T7 L1 Int 2, 3, 4, 5 & 6 (Netball)

Teacher has the students practice their chest pass, overhead pass and bounce pass to each other in a drill format.

10.3 Game Setting

Game Setting tends to be more authentic and free flow, with some improvisational aspect to it, where students can interpret the rules and devise strategies as they see fit. Game settings do not necessarily require students/teachers to keep score and can be semi-structured with rules and varying number of students involved in the game (i.e., 1v1, 2v2, 3v3 and so on). Code for Experimental/Exploratory (1.10) if coding for game setting.

P5 Example: S12T5 L9 Int 3 to 13 (Badminton)

Teacher has the students play Badminton against each other in a King of the Hill format (winner stays, umpire becomes the next challenger, and the next player in line becomes the umpire).

S3 Example: S51T7 L7 Int 4, 5, 6 & 7 (Netball)

Teacher has the students play Netball games against each other in a round robin format.

11 DOMAIN SPECIFIC KNOWLEDGE

11.1 Understand and apply movement concepts, principles and strategies in Games from Net-Barrier Category (Badminton, Table Tennis, Volleyball) (1v1)

Highlights the concepts, principles and strategies students have to employ when taking part in these games, namely how to win the point, setting up an attack, defending against an attack, and defending space.

Codes:

- Send the object into space that is located at either back (close to boundary) or front (close to the net or service line) away from the opponent to prevent the opponent from returning the object (depth)
- Send the object into space that is located close to the side and away from the opponent to prevent the opponent from returning the object (width)
- Find the central base position to maximise court coverage
- Move from the central base position to return the shot
- Recover to the central base position after returning the object to maximise court coverage

P5 Examples: S9T5 (Badminton), S12T5 (Badminton)

S3 Examples: S52T10 (Volleyball), S55T11 (Volleyball), S59T11 (Volleyball)

11.2 Understand and apply movement concepts, principles and strategies in Games from Net-Barrier Category (Badminton, Table Tennis, Volleyball) (2v2, 3v3)

Highlights the concepts, principles and strategies students have to employ when taking part in these games, namely how to win the point, setting up an attack, defending against an attack, and defending space.

Codes:

- Send the object into space that is located close to the net, deep to the sides, or between the 2 opponents to prevent the opponent from returning the object **(On-the-ball attacker)**
- Maintains central base position to maximise court coverage **(Off-the-ball attacker)**

- Moves to position to either 'win the point' or carry on to 'set up the attack'
(Off-the-ball attacker)
- Moves from central base position to return the object **(On-the-ball receiver)**
- Recovers to the original central base position after returning the object to maximise court coverage **(On-the-ball receiver)**
- Covers by moving to a new central base position for the larger playing area
(Off-the-ball receiver)
- Recovers to the original central base position once the on-the-ball receiver has started to move back to his original central base position **(Off-the-ball receiver)**

P5 Examples: S9T5 (Badminton), S12T5 (Badminton)

S3 Examples: S52T10 (Volleyball), S55T11 (Volleyball), S59T11 (Volleyball)

11.3 Understand and apply movement concepts, principles and strategies in Games from Striking-Fielding Category (Softball)

Highlights the concepts, principles and strategies students have to employ when taking part in these games, namely how to send into space, advancing bases to score, defending space, and defending bases.

Codes:

- Sends the ball into open space, away from the bases that the runners are approaching (Hitter)
- Maximise coverage of the space as a team (before ball is sent)
- Fielder closest to the ball fields the ball and throws towards the base the runner is approaching (after ball is sent)
- Fielder closest to base to be in position to be ready to receive a fielded ball (after ball is sent)
- Remaining fielders to support the fielding by being available to:
 - relay the pass when the ball is too far out in the outfield
 - retrieve the ball in the event of a fielding error (after ball is sent)

- Moves when the ball is away from the base that the runner is approaching (Hitter, 1st base runner, 2nd base runner, 3rd base runner)
- Moves to 2nd/3rd base/home (forced run) and subsequent bases if ball is away from the base that the runner is approaching (1st base runner/2nd base runner/3rd base runner)
- Fielder closest to the ball fields the ball and throws or brings the ball towards the nearest base (after ball is sent)
- Fielder closest to base to be in position to be ready to receive a fielded ball (after ball is sent)
- Remaining fielders to support the fielding by being available to:
 - relay the pass when the ball is too far out in the outfield
 - retrieve the ball in the event of a fielding error (after ball is sent)
- If any runner is advancing, fielder with the ball sends the ball to the base that the runner is approaching (after ball is sent)
- Fielder with the ball checks that no runner is advancing and returns the ball to the catcher/pitcher (after ball is sent)

P5 Examples: S11T5 (Softball)

S3 Examples: S56T11 (Softball), S60T11 (Softball)

11.4 Understand and apply movement concepts, principles and strategies in Games from Territorial-Invasion Category (Basketball, Floorball, Football, Netball, Ultimate Frisbee)

Highlights the concepts, principles and strategies students have to employ when taking part in these games, namely how to keep possession of the ball, using space to invade, creating space to invade, attacking the goal, regaining possession of the ball, delaying invasion, denying space to invade, and denying scoring opportunity.

Codes:

- Moves towards the goal (**On-the-ball attacker**)
- Sends the ball to off-the-ball attacker (**On-the-ball attacker**)

- Supports on-the-ball attacker by moving nearer the goal and be ready to receive a pass (**Off-the-ball attacker**)
- Protects the ball from on-the-ball defender by placing the body between the ball and the on-the-ball defender (**On-the-ball attacker**)
- Moves beyond the personal space of the on-the-ball defender (**On-the-ball attacker**)
- Supports on-the-ball attacker by moving beyond the personal space of the off-the-ball defender and into the line of pass and be ready to receive a pass (**Off-the-ball attacker**)
- Moves into the personal space of the on-the-ball attacker (pressure) and into the line of pass to get the ball back, to prevent a pass or force an unsuccessful pass (**On-the-ball defender**)
- Moves into the personal space of the off-the-ball attacker and into the line of pass to get the ball back or force an unsuccessful pass (**Off-the-ball defender**)
- Moves and shoots when within range and ability and follow through for a possible rebound (**On-the-ball attacker**)
- Moves beyond the personal space of the on-the-ball defender and shoot when within ability and range and follow through for a possible rebound (**On-the-ball attacker**)
- Sends the ball to off-the-ball attacker (**On-the-ball attacker**)
- Moves into position for a possible rebound (**Off-the-ball attacker**)
- Pressures on-the-ball attacker to prevent him from having a clear line to shoot or force an unsuccessful shot (**On-the-ball defender**)
- Moves into the personal space of the off-the-ball attacker to prevent him from receiving a pass or possible rebound (**Off-the-ball attacker**)

P5 Examples: S1T5 (Games & Sports), S2T5 (Tchoukball), S3T5 (Floorball), S4T5 (Tchoukball), S5T5 (Floorball), S7T5 (Basketball), S10T4 (Basketball)

S3 Examples: S50T7, S51T9, S53T11, S54T11, S57T11, S58T8, S62T9

12 DOMAIN SPECIFIC SKILLS (PRIMARY 5)

Code absent or present (0/1) for each phase. Multiple codes are permissible for each phase.

12.1 Acquire a range of motor skills in games from Net-Barrier Category (Badminton, Table Tennis, Volleyball)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Strike/Serve/ Volley the object in the intended direction and move to the desired position
- Move to position to strike/volley the object in the intended direction and move back to desired position
- Travelling

P5 Examples: S9T5 (Badminton), S12T5 (Badminton)

12.2 Acquire a range of motor skills in games from Striking-Fielding Category (Softball)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Strike/Kick/Throw a ball so that it travels in the intended direction and move to the desired position
- Travelling
- Receive and send a ball to a teammate

P5 Examples: S11T5 (Softball)

12.3 Acquire a range of motor skills in games from Territorial-Invasion Category (Basketball, Floorball, Football, Netball, Ultimate Frisbee)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Dribble towards the goal, keeping away from defender (**On-the-ball attacker**)
- Throw/Kick/Push to a stationary or moving teammate and move to a new position (**On-the-ball attacker**)
- Shield the ball from the defender (**On-the-ball attacker**)
- Shoot on goal (**On-the-ball attacker**)
- Move into position to receive a throw/kick/push (**Off-the-ball attacker**)
- Move into position for a rebound (**On- and off-the-ball attacker**)
- Move into position to tackle (**On-the-ball defender**)
- Move into position to block/intercept/prevent a throw/ kick/push (**On- and off-the-ball defender**)

P5 Examples: S1T5 (Games & Sports), S2T5(Tchoukball), S3T5 (Floorball), S4T5 (Tchoukball), S5T5 (Floorball), S7T5 (Basketball), S10T4 (Basketball)

13 SKILLS (SECONDARY 3)

Code absent or present (0/1) for each phase. Multiple codes are permissible for each phase.

13.1 Acquire a range of motor skills in games from Net-Barrier Category (Badminton)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Smashing - Forehand (**Offence**)
- Serving - Forehand (Low and High) (**Offence**)
- Hitting - Overhead Drop Shot - Forehand (**Offence**)
- Hitting - Net Lift - Forehand (**Defence**)
- Hitting - Overhead Clear - Forehand (**Defence**)
- Hitting - Net Shot - Forehand (**Offence & Defence**)
- Footwork - Running Steps (**Offence & Defence**)
- Footwork - Split Steps (**Offence & Defence**)
- Footwork - Side Shuffle (**Offence & Defence**)
- Footwork - Lunge (**Offence & Defence**)

S3 Examples: N/A

13.2 Acquire a range of motor skills in games from Net-Barrier Category (Table Tennis)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Driving/Smashing/Pushing - Forehand (**Offence**)
- Driving/Smashing - Backhand (**Offence**)
- Serving - Forehand (**Offence**)
- Serving - Backhand (**Offence**)
- Footwork - One Step (**Defence**)
- Footwork - Side Step (**Defence**)
- Footwork - Cross Step (**Defence**)
- Blocking/Pushing - Forehand (**Defence**)
- Blocking/Pushing - Backhand (**Defence**)
- Return to the left of the centreline (**Defence**)

S3 Examples: N/A

13.3 Acquire a range of motor skills in games from Net-Barrier Category (Volleyball)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Spiking/Tipping (Offence)
- Serving - Underhand (Offence)
- Serving - Overhead (Offence)
- Passing - Forearm (Offence)
- Passing - Overhead (Offence)
- Blocking (Defence)
- Digging (Defence)
- Footwork - Running Steps (Defence)
- Footwork - Shuffle Steps (Defence)
- Footwork - Side Steps (Defence)
- Footwork - Lunge (Defence)

S3 Examples: S52T10 (Volleyball), S55T11 (Volleyball), S59T11 (Volleyball)

13.4 Acquire a range of motor skills in games from Striking-Fielding Category (Softball)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Pitching - Underhand toss (Offence)
- Batting - Ground ball (Offence)
- Batting - Fly ball (Offence)
- Catching - Ground ball (with 1 or 2 hands) (Defence)
- Catching - Fly ball (with 1 or 2 hands) (Defence)
- Throwing - Overhand (Defence)

- Throwing - Underhand (Defence)
- Running (Offence & Defence)

S3 Examples: S56T11 (Softball), S60T11 (Softball)

13.5 Acquire a range of motor skills in games from Territorial-Invasion Category (Basketball)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Footwork - 1-Foot Landing (Offence)
- Footwork - 2-Foot Landing (Offence)
- Dodging - Body Feint (Offence)
- Dodging - L-Cut (Offence)
- Dodging - V-Cut (Offence)
- Passing - Chest Pass (Offence)
- Passing - Bounce Pass (Offence)
- Passing - Overhead Pass (Offence)
- Receiving (Offence)
- Dribbling - Dominant Hand (Offence)
- Dribbling - Non-Dominant Hand (Offence)
- Crossover Dribble (Offence)
- Shooting - 1-Handed Set Shot (Offence)
- Shooting - 1-Handed Jump Shot from Under the Basket (Offence)
- Intercepting (Defence)
- Rebounding (Defence)
- Guarding - Defensive Stance (Defence)
- Guarding - Positioning (Defence)
- Guarding - Slide Step (Defence)
- Guarding - Drop Step (Defence)

S3 Examples: S58T8 (Basketball)

13.6 Acquire a range of motor skills in games from Territorial-Invasion Category (Floorball)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Shielding (Offence)
- Dodging - Body Feint (Offence)
- Dodging - Stick Feint (Offence)
- Passing - Forehand - Wrist (Offence)
- Passing - Forehand - Drag (Offence)
- Receiving - On the Forehand Blade (Offence)
- Receiving - On the Reverse Blade (Offence)
- Dribbling - Forehand - Open (Offence)
- Dribbling - Forehand - Closed (Offence)
- Dribbling - Forehand - Cross Over (Offence)
- Shooting - Forehand - Wrist (Offence)
- Shooting - Forehand - Drag (Offence)
- Intercepting - On the Forehand Blade (Defence)
- Intercepting - On the Reverse Blade (Defence)
- Intercepting - Defensive Stance (Defence)
- Intercepting - Positioning (Defence)
- Marking - Defensive Stance (Defence)
- Marking - Positioning (Defence)
- Tackling - Block (Defence)
- Tackling - Poke (Defence)
- Tackling - Positioning (Defence)

S3 Examples: S53T11 (Floorball), S54T11 (Floorball)

13.7 Acquire a range of motor skills in games from Territorial-Invasion Category (Football)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Dodging - Body Feint (Offence)
- Passing - Using Inside of the Foot (Offence)
- Passing - Using Outside of the Foot (Offence)
- Passing - Push Pass (Offence)
- Passing - Wall Pass (Offence)
- Receiving - Using Inside of the Foot (Offence)
- Receiving - Trapping with Sole of Foot (Offence)
- Shielding (Offence)
- Dribbling - Forward (Offence)
- Dribbling - Dragging the Ball Forward, Backward and Side-To-Side, and Turn 180 Degrees (Offence)
- Turning - Inside (Offence)
- Turning - Outside (Offence)
- Shooting - In-step (Offence)
- Intercepting (Defence)
- Marking - Defensive Stance (Defence)
- Marking - Positioning (Defence)
- Tackling - Block Tackle (Defence)
- Tackling - Poke Tackle (Defence)

S3 Examples: N/A

13.8 Acquire a range of motor skills in games from Territorial-Invasion Category (Netball)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Footwork - 1-Foot and 2-Feet Landing (Offence)
- Footwork - Pivoting in All Directions (Offence)
- Getting Free - Straight Lead (Offence)
- Getting Free - Dodges (Single/Double) (Offence)
- Getting Free - Change in Pace (Offence)
- Getting Free - Change in Direction (Offence)
- Passing - Chest Pass (Offence)
- Passing - Bounce Pass (Offence)
- Passing - Overhead Pass (Offence)
- Passing - Shoulder Pass (Offence)
- Passing - Lob Pass (Offence)
- Receiving the Ball (Offence)
- Shooting - 1-Handed Shot (Offence)
- Intercepting (Defence)
- Rebounding (Defence)
- Defending On-the-Ball Player - Hands Over the Ball (Defence)
- Defending On-the-Ball Player - Intercepting (Defence)
- Defending On-the-Ball Player - Blocking (Defence)
- Defending On-the-Ball Player - Defensive Stance (Open/Close) (Defence)
- Defending On-the-Ball Player - Defensive Footwork (Shadow Defence) - (Defence)
- Defending On-the-Ball Player - Drop Back (Defence)
- Defending the Shot - Hands Over the Ball (Defence)
- Defending the Shot - Intercepting (Defence)
- Defending the Shot - Block Out (Defence)

S3 Examples: S51T9 (Netball), S57T11 (Netball)

13.9 Acquire a range of motor skills in games from Territorial-Invasion Category (Ultimate Frisbee)

Highlights the skills students have learnt previously on what to do and how to do it determined by the context presented in the situational game.

Codes:

- Throwing - Forehand (Offence)
- Throwing - Backhand (Offence)
- Footwork - Pivoting (Offence)
- Footwork - Stopping (Offence)
- Footwork - Cutting (Offence)
- Dodging - Body Feint (Offence)
- Faking - Forehand Fake (Offence)
- Faking - Backhand Fake (Offence)
- Marking (When Marking the Cutter) - Positioning (Defence)
- Marking (When Marking the Thrower) - Defensive Stance (Defence)
- Catching - Pancake Catch (Offence & Defence)
- Catching - 1-Handed Rim Catch (Offence & Defence)
- Catching - 2-Handed Rim Catch (Offence & Defence)

*Thrower refers to on-the-disc attacker

*Cutter refers to off-the-disc attacker"

S3 Examples: N/A

LESSON LEVEL

We are coding for quality at the lesson level while coding for quantity at the phasal level. Hence, Level 0 is not “not present”, “absent”, “no evidence”. If we are coding for quality, Level 0 cannot indicate “no quality” (impossible) but rather “low quality” or “unsatisfactory” (in MQI terminology). Therefore, the following scores are to be used when coding at the lesson level:

Level 0: Unsatisfactory

Level 1: Satisfactory

Level 2: Good Quality

Level 3: High Quality

When coding a lesson level code, look at the critical attributes for each level (0-3) of that code. If the majority of the attributes of a particular level are observed in the lesson, code for that level. The following are a few rules to guide this decision.

Rule 1: If the majority of attributes are in that level, code that level. E.g., you observe 3 attributes at level 0 and 1 attribute at level 3: Code as level 0

Rule 2: If the attributes are equally distributed across 2 levels, code the higher level. E.g., you observe 2 attributes at level 0 and 2 attributes at level 3: Code as level 3

Rule 3: If the attributes are equally distributed across all levels, code the highest level. E.g., you observe 1 attribute at level 0, 1 at level 1, 1 at level 2 and 1 at level 3: Code as level 3.

14. Positive Classroom Culture

- a. Level 0 (Unsatisfactory)** - Patterns of classroom interactions are mostly negative, inappropriate. Student interactions are characterized by sarcasm, put-downs, or conflict. The teacher does not deal with disrespectful behaviour. There appear to be no established standards of conduct. There is little or no teacher monitoring of student behavior.

Critical attributes are:

- i. The teacher is disrespectful toward students.
- ii. Students’ body language indicates feelings of hurt, discomfort, or insecurity.

- iii. The teacher disregards disrespectful interactions among students.
- iv. The teacher does not monitor student behavior.
- v. Some students disrupt the classroom, without apparent teacher awareness or with an ineffective response.

Possible Examples:

- A student slumps in his chair following a comment by the teacher.
- Students roll their eyes at a classmate's idea; the teacher does not respond.
- Many students talk when the teacher and other students are talking; the teacher does not correct them.
- Some students refuse to work with other students.
- The teacher does not call students by their names.
- Students are talking among themselves, with no attempt by the teacher to silence them.

- b. Level 1 (Satisfactory)** - Patterns of classroom interactions are generally appropriate but may reflect occasional inconsistencies, favoritism. Students rarely demonstrate disrespect for one another. The teacher attempts to respond to disrespectful behavior, with uneven results. Standards of conduct appear to have been established but with inconsistent implementation. Teacher tries with uneven results to monitor student behaviour.

Critical attributes are:

- i. The quality of interactions between teacher and students, or among students, is uneven, with occasional disrespect or insensitivity.
- ii. The teacher attempts to respond to disrespectful behavior among students, with uneven results.
- iii. The teacher attempts to keep track of student behavior, but with no apparent system.
- iv. The teacher's response to student misbehavior is inconsistent: sometimes harsh, other times lenient.

Possible Examples:

- Students attend passively to the teacher, but tend to talk, pass notes, etc. when other students are talking.

- A few students do not engage with others in the classroom, even when put together in small groups.
- Students applaud half-heartedly following a classmate's presentation to the class.
- The teacher says, "Don't talk that way to your classmates," but the student shrugs her shoulders.
- Classroom rules are posted, but neither the teacher nor the students refer to them.

c. Level 2 (Good Quality) - Teacher-student interactions are friendly and demonstrate general caring and respect. Interactions among students are generally polite and respectful, and students exhibit respect for the teacher. The teacher responds successfully to disrespectful behavior among students. The teacher monitors student behavior against established standards of conduct. Teacher response to student misbehavior is consistent, proportionate, and respectful to students and is effective. The net result is polite, respectful, and business-like, though students may be somewhat cautious about taking intellectual risks.

Critical attributes are:

1. Talk between the teacher and students and among students is uniformly respectful.
2. The teacher successfully responds to disrespectful behavior among students.
3. Students participate willingly, but may be somewhat hesitant to offer their ideas in front of classmates.
4. The teacher frequently monitors student behavior.

Possible Examples:

- Students attend fully to what the teacher is saying.
- Students wait for classmates to finish speaking before beginning to talk.
- Students help each other and accept help from each other.
- The teacher and students use courtesies such as "please," "thank you," and "excuse me."

- The teacher says, “Don’t talk that way to your classmates,” and the insults stop.
- Upon a nonverbal signal from the teacher, students correct their behavior.
- The teacher moves to every section of the classroom, keeping a close eye on student behavior.

d. Level 3 (High Quality) - Classroom interactions between the teacher and students and among students are highly respectful, reflecting genuine warmth, caring, and sensitivity to students as individuals. Students exhibit respect for the teacher and contribute to high levels of civility among all members of the class. Students take an active role in monitoring their own behavior and/or that of other students against standards of conduct. Teacher monitoring of student behavior is subtle and preventive. The net result is an environment where all students feel valued and are comfortable taking intellectual risks

Critical attributes are:

- i. The teacher demonstrates knowledge and caring about individual students’ lives beyond the class and school.
- ii. There is no disrespectful behavior among students.
- iii. When necessary, students respectfully correct one another.
- iv. The teacher respects and encourages students’ efforts.
- v. The teacher silently and subtly monitors student behavior.
- vi. Students respectfully intervene with classmates at appropriate moments to ensure compliance with standards of conduct.

Possible Examples:

- Students say “Shhh” to classmates who are talking while the teacher or another student is speaking.
- A student questions a classmate, “Didn’t you mean _____?” and the classmate reflects and responds, “Oh, maybe you are right!”
- The teacher notices that some students are talking among themselves and without a word moves nearer to them; the talking stops.
- The teacher speaks privately to a student about misbehavior.
- A student reminds her classmates of the class rule about incorrect behaviour.

15. Visible Teaching and Learning

- a. Level 0 (Unsatisfactory)** - The lesson purpose is unclear to students and students do not appear to be aware of assessment criteria.

Critical attributes are:

- i. At no time during the lesson does the T convey to Ss what they will be learning.
- ii. T gives no indication of what high quality work looks like or what the assessment criteria for the task is.

Possible Examples:

- S: What are we supposed to be learning? (T ignores).
- S: How is this assignment going to be graded?

- b. Level 1 (Satisfactory)** - The teacher's attempt to explain the lesson purpose has only limited success.

Critical attributes are:

- i. T provides little elaboration or explanation about what the Ss will be learning.
- ii. There is little evidence that Ss understand how their work will be evaluated.

Possible Examples:

- T: Oh, by the way, today we're going to do play Softball. Go.

- c. Level 2 (Good Quality)** - The lesson purpose is clearly communicated to students, including where it is situated within broader learning. Students appear to be aware of assessment criteria.

Critical attributes are:

1. T states clearly, at some point during the lesson, what Ss will be learning.
2. T makes the assessment criteria and/or standards of high quality work clear to students.

Possible Examples:

- T: By the end of today's lesson, you'll all be able to understand the rules and gameplay of Softball.

- d. Level 3 (High Quality)** - T links lesson purpose to larger curriculum. Students appear to be aware of, and there is some evidence that they have contributed to, the assessment criteria.

Critical attributes are:

- i. If asked, Ss are able to explain what they are learning and where it fits into the larger curriculum context.
- ii. T indicates clearly the assessment criteria, characteristics of high (and possibly low) quality work, or students might have contributed to the assessment criteria.

Possible Examples:

- Ss: We've learned about how important it is to cover all the bases and the outfield in Softball. By maximising our coverage, we are able to cover more ground and prevent our opponents from scoring easily.
- T reminds students of characteristics of high quality work, and gives Ss opportunities to decide what criteria are important

16. Lesson Enactment: Questioning and Discussion

Questioning and discussion be used as techniques to deepen student understanding rather than serve as recitation, or a verbal “quiz.” Good teachers use divergent as well as convergent questions, framed in such a way that they invite students to formulate hypotheses, make connections, or challenge previously held views.

Students' responses to questions are valued; effective teachers are especially adept at responding to and building on student responses and making use of their ideas.

High-quality questions encourage students to make connections among concepts or events previously believed to be unrelated and to arrive at new understandings of complex material.

Class discussions are animated, engaging all students in important issues and promoting the use of precise language to deepen and extend their understanding. These discussions may be based around questions formulated by the students themselves.

When a teacher is building on student responses to questions (whether posed by the teacher or by other students), students are challenged to explain their thinking and to cite specific text or other evidence (for example, from a scientific experiment) to back up a position. This focus on argumentation forms the foundation of logical reasoning, a critical skill in all disciplines.

Not all questions must be at a high cognitive level in order for a teacher's performance to be rated at a high level; that is, when exploring a topic, a teacher might begin with a series of questions of low cognitive challenge to provide a review, or to ensure that everyone in the class is "on board." Furthermore, if questions are at a high level but only a few students participate in the discussion, the teacher's performance on the component cannot be judged to be at a high level (FFT Manual).

- a. Level 0 (Unsatisfactory)** - The teacher's questions are of low cognitive challenge (single correct responses). Interaction between the teacher and students is predominantly IRE, with the teacher mediating all questions and answers. The teacher accepts all contributions without asking students to explain their reasoning. Only a few students participate in the discussion.

Critical attributes are:

- i. Questions are rapid-fire and convergent, with a single correct answer.
- ii. Questions do not invite student thinking.
- iii. Students do not speak directly to one another.
- iv. The teacher does not ask students to explain their thinking.
- v. Only a few students dominate the discussion

Possible Examples:

- The teacher asks a question for which the answer is on the board; students respond by reading it.
- The teacher calls only on students who have their hands up.
- A student responds to a question with wrong information, and the teacher doesn't follow up.

- b. Level 1 (Satisfactory)** - The teacher's questions lead students through a pre-determined series of answers. The teacher attempts to ask some questions designed to engage students in thinking, but only a few students are involved.

The teacher attempts to engage all students in the discussion, to encourage them to respond to one another, and to explain their thinking, with uneven results

Critical attributes are:

- i. The teacher frames some questions designed to promote student thinking, but many have a single correct answer, and the teacher calls on students quickly.
- ii. The teacher invites students to respond directly to one another's ideas, but few students respond.
- iii. The teacher calls on many students, but only a small number actually participate in the discussion.
- iv. The teacher asks students to explain their reasoning, but only some students attempt to do so.

Possible Examples:

- The teacher asks, "Who has an idea about this?" The usual three students offer comments.
 - The teacher asks, "Maria, can you comment on Ian's idea?" but Maria does not respond.
 - The teacher asks a student to explain his reasoning for why players have to spread out and not cluster together but does not follow up when the student falters.
- c. Level 2 (Good Quality)** - Teacher poses questions designed to promote student thinking and understanding. The teacher creates a genuine discussion among students, providing adequate time for students to respond and stepping aside when doing so is appropriate. The teacher challenges students to justify their thinking and successfully engages most students in the discussion, employing a range of strategies to ensure that most students are heard.

Critical attributes are:

1. The teacher uses open-ended questions, inviting students to think and/or offer multiple possible answers.
2. The teacher makes effective use of wait time.
3. Discussions enable students to talk to one another without ongoing mediation by teacher.

4. The teacher calls on most students, even those who don't initially volunteer.
5. Many students actively engage in the discussion.
6. The teacher asks students to justify their reasoning, and most attempt to do so.

Possible Examples:

- The teacher asks, "What might have happened if James had moved to cover Danny and left Kevin open?"
- The teacher uses the plural form in asking questions, such as "What are some things you think might contribute to _____?"
- The teacher poses a question, asking every student to write a brief response and then share it with a partner, before inviting a few to offer their ideas to the entire class.

- d. Level 3 (High Quality)** - The teacher uses a variety or series of questions or prompts to challenge students cognitively, advance high-level thinking and discourse, and promote metacognition. Students formulate many questions, initiate topics, challenge one another's thinking, and make unsolicited contributions. Students themselves ensure that all voices are heard in the discussion.

Critical attributes are:

- i. Students initiate higher-order questions.
- ii. The teacher builds on and uses student responses to questions in order to deepen student understanding.
- iii. Students extend the discussion, enriching it.
- iv. Students invite comments from their classmates during a discussion and challenge one another's thinking.
- v. Virtually all students are engaged in the discussion

Possible Examples:

- A student asks, "How many ways are there to get a homerun in Baseball?"
- A student says to a classmate, "I don't think I agree with you on this, because..."
- A student asks of other students, "Does anyone have another idea how we might figure this out?"

- A student asks, “What if...?”

17. Lesson Enactment: Conceptual Development

- a. Level 0 (Unsatisfactory)** - T’s explanation of content contains major errors. Use of academic vocabulary is vague/inappropriate/used incorrectly, leaving Ss confused

Critical attributes are:

- Ss indicate through body language or questions that they don’t understand the content being presented.
- T makes serious content error that affects Ss’ understanding of lesson.
- T explanations are largely factual or procedural.
- T’s communications include errors of vocabulary or usage or imprecise use of academic language.

Possible Examples:

- T uses technical terms without explaining their meanings.

- b. Level 1 (Satisfactory)** - T’s explanation of content contains minor errors; some parts are clear but others hard to follow. T’s explanation does not invite Ss to engage intellectually. T rarely takes opportunities to explain academic vocabulary.

Critical attributes are:

- T’s explanation of content is a monologue, with minimal participation or intellectual engagement by students.
- T makes minor but not serious content errors.
- T explanations are largely factual or procedural.
- T attempts to explain academic vocabulary, but only partially successfully, or vocabulary might be too advanced for the Ss.

Possible Examples:

- T: Watch me while I show you how to solve this (Ss listen only).
- Ss do not seem to be following the T explanation, or are inattentive.
- Ss’ use of academic vocabulary is imprecise, with little T intervention/correction.

- c. Level 2 (Good Quality)** - T explanation is clear, scaffolded, accurate, connects with Ss knowledge and experience. During the explanation, T invites

S engagement. T's use of academic vocabulary is precise and serves to extend S understanding.

Critical attributes are:

1. T explanation is clear.
2. T makes no content errors.
3. T invites S participation e.g., through application or interpretation of ideas/concepts.
4. T's vocabulary and usage are correct and provides explanation of academic vocabulary.

Possible Examples:

- T explanation is clear and invites S participation and thinking.
- T makes no content errors.
- T describes specific strategies Ss might use, inviting Ss to interpret them in context of what they are learning.
- T's vocabulary and usage are correct and provides explanation of academic vocabulary.

- d. Level 3 (High Quality)** - The teacher's explanation of content is thorough and clear, developing conceptual understanding through clear scaffolding and connecting with students' interests. Students contribute to extending the content by explaining concepts to their classmates and suggesting strategies that might be used. Teacher finds opportunities to extend students' vocabularies, both within the discipline and for more general use.

Critical attributes are:

- i. The teacher explains content clearly and imaginatively, using metaphors and analogies to bring content to life.
- ii. The teacher points out possible areas for misunderstanding.
- iii. The teacher invites students to explain the content to their classmates.
- iv. Students suggest other strategies they might use in approaching a challenge or analysis.

Possible Examples:

- The teacher explains content clearly and imaginatively, using metaphors and analogies to bring content to life.
- The teacher points out possible areas for misunderstanding.

- The teacher invites students to explain the content to their classmates.
- Students suggest other strategies they might use in approaching a challenge or analysis.

18. Metacognition

- a. Level 0 (Unsatisfactory)** - Primarily, the focus is on what has been learnt as part of a broad evaluation of student work. Tasks and participatory structures do not promote students' metacognitive awareness and at best, students seek confirmation of their understanding of the lesson content.

Critical attributes are:

- Students largely focus on what they have learnt based on teacher-initiated strategies such as checklist, 3-2-1 summarizer, online forums etc.
- Teacher does not provide explicit instruction about how students might generate metacognitive awareness about their learning.
- Tasks/activities require students to state accurate responses, and students surface queries about the specific task requirements rather than their own learning.
- Students lack opportunities to articulate their thought processes to other classroom participants and generally, seek to confirm and clarify their understanding of the content taught with the teacher.
- Students lack clarity about the learning goals and/or do not have sufficient time to review or revise their work in relation to the curricular goals or stated criteria.

Possible Examples:

- When asked to practice a 2v1 situation in Football, Students ask the T: So I just pass the ball to my teammate when I get close to the defender?
T says: Yes.
- During practice, T asks questions and teaches students to monitor their teammates by constantly asking themselves if they understand what they are
- Students, in groups, discuss how much change has occurred in what they have learnt since the last lesson and share a summary with the class.
- In a whole class setting, each student responds to T's question: How do I feel about this game/activity? (excited, anxious, curious, nervous etc.)

- b. Level 1 (Satisfactory)** - Tasks/activities allow students the space to think about their learning in terms of what and how. Based on teacher-initiated strategies, students are generally able to surface and communicate aspects of their learning and take stock of their learning journey in view of the stated curricular goals.

Critical attributes are:

- i. Students show awareness of what and how they have learnt based on teacher-initiated strategies e.g., think aloud, visual organizers, What and How I Learn exercises etc.
- ii. Teacher engages in reflexive talk and explicitly instructs students about knowing and regulating aspects of their cognition.
- iii. Tasks/activities require students to describe or explain the procedures or steps used.
- iv. Students verbalize their thought processes while talking about their learning and are able to follow through based on one-to-one interactions with their teacher and/or peers.
- v. Students have space to interact with and review their own learning in relation to the stated learning goals and performance criteria, surface aspects which need correction and articulate strategies used in completing the assigned task/activity.

Possible Examples:

- In a lesson on Softball, the teacher advises the students on the strategies they should employ to score on their opponents. T points out that if students pick their hitters in a strategic order, then they can maximise their chances of scoring more runs with their best hitter.
- T engages in reflexive talk and asks the students what aspects they considered when assigning players to their positions in a game of Netball.
- T asks students why they chose certain strategies when playing Tchoukball.
- Student verbalised his thought processes on why he would aim to play the shuttlecock to the far corners in Badminton.
- T asks students to recall how they were thinking about the lesson topic prior to the learning activities and compare that with how they are thinking about the same topic now.

- c. Level 2 (Good Quality)** - Students show some evidence of self-direction as T models and instructs students about strategic thinking and communicating their reasoning. Students demonstrate awareness of the strategies used and have access to the thinking of other classroom participants.

Critical attributes are:

1. Students show some self-direction in terms of their awareness of what and how they have learnt based on teacher-initiated strategies e.g., role play, use of Mind Maps, reflective journal writing etc. and/or conversations with the teacher and/or peers.
2. T provides explicit instruction in metacognition and models how s/he wants students to describe, explain or justify their thinking.
3. Tasks/activities permit space for students to reveal explicitly how they are thinking about the problem/issue or how they arrived at certain solutions.
4. Students have opportunities to communicate their own thinking as well as gain access to the thought processes of other classroom participants in whole class or pair/group contexts.
5. Students engage with the learning goals and performance criteria, and think strategically about why some heuristics/methods/strategies in their toolbox may be better than others.

Possible Examples:

- T tells his students: Model your thought processes in solving problems—for example, “This is a lot of information; where should I start? Now that I know ____, is there something else I know?”
- Students in groups identify two or more instances where they could have had better teamwork. Students then need to discuss and tell the rest of the class why it is important to address these issues.
- T provides students with guidance and models how to think of strategies when faced with another team, giving the students tips on how to identify weaknesses and extenuate their strengths.
- T encourages students to review their game performance: What are you going to do differently for your next game? Why do you think your preferred approach can possibly work?

d. Level 3 (High Quality) - Students as self-directed learners engage with their personal learning goals planning, monitoring and reflecting on their learning. Collaborative activities permit students to think about the thought processes of other classroom participants with new, shared understandings emerging. Students draw meaningful connections across various aspects of their learning.

Critical attributes are:

- i. As self-directed learners, students take the initiative in making their thinking processes transparent, focusing on monitoring and regulating their learning by considering what did I learn and how do/did I learn and how can I manage my learning more effectively.
- ii. T ‘presses’ students to think conceptually, challenges students to surface their assumptions and helps them in being critical of the quality of their reasoning, and enables students to see the inter-connectedness of the different aspects of their learning.
- iii. Tasks/activities include criteria which allow students to test and revise their current ways of thinking, and create contexts that permit students to use self-regulating tactics in planning, carrying out and reflecting on the task.
- iv. Participatory structures such as collaborative activities permit students’ ‘thinking about thinking’ which enables them to communicate and share with other classroom participants, opening up space for students to detect flawed ideas, expand understandings and build knowledge.
- v. In view of the articulated learning goals, students set specific personal learning goals and reflect on the applicability and rationale for using the given heuristics/methods/strategies in different situations.

Possible Examples:

- T addresses her students during a class on Badminton: In having a discussion with your partner, did you realize what are some things that you could have done better? Like Daryl shared with me that he didn’t move back to the center of the court fast enough to cover his space. Then I asked him why didn’t you cover the space? Then he said it’s because he thought that he could react in time and that it was not so important. He thought that he would be able to run and hit the shuttlecock wherever it fell.

- T initiates a discussion with students about how asking the given questions can help them in thoughtful planning about how they might approach a new idea or topic.
- Consolidating the lesson focus, T gives his/her list of 3 key ideas from the lesson for students to self-check. Students record the differences between their responses and the teacher's. In pairs, students discuss the possible reasons for the differences in the takeaway from the lesson.
- When cooling down after a game of Softball, T explains the points for discussion: What strategies did you decide on before you started? How did you adjust once things were not going as planned? Check with your peers and come up with at least three learning points per group.

19. Instructional Flexibility/Pedagogical Agility

- a. Level 0 (Unsatisfactory)** - The teacher ignores students' questions; when students have difficulty learning, the teacher blames them or their home environment for their lack of success. The teacher makes no attempt to adjust the lesson even when students don't understand the content

Critical attributes are:

- The teacher ignores indications of student boredom or lack of understanding.
- The teacher brushes aside students' questions.
- The teacher conveys to students that when they have difficulty learning, it is their fault.
- The teacher makes no attempt to adjust the lesson in response to student confusion

Possible Examples:

- T: We don't have time for that today
- T: Pay attention, you can understand this!

- b. Level 1 (Satisfactory)** - The teacher accepts responsibility for the success of all students but has only a limited repertoire of strategies to use. Adjustment of the lesson in response to assessment is minimal or ineffective.

Critical attributes are:

- The teacher makes perfunctory attempts to incorporate students' questions and interests into the lesson.

- ii. The teacher conveys to students a level of responsibility for their learning but also his uncertainty about how to assist them.
- iii. The teacher's attempts to adjust the lesson are partially successful

Possible Examples:

- T: I'll try to think of another way to answer this and get back to you
 - T: I realise not everyone understands this but we don't have anymore time on this, we need to move on.
- c. Level 2 (Good Quality)** - The teacher successfully accommodates students' questions and interests. Drawing on a broad repertoire of strategies, the teacher persists in seeking approaches for students who have difficulty learning. If impromptu measures are needed, the teacher makes a minor adjustment to the lesson and does so smoothly

Critical attributes are:

1. The teacher incorporates students' interests and questions into the heart of the lesson.
2. The teacher conveys to students that she has other approaches to try when the students experience difficulty.
3. When improvising becomes necessary, the teacher makes adjustments to the lesson

Possible Examples:

- T: That's an interesting idea, let's see how that fits.
 - T: This seems to be too difficult for you to understand, let's try this way (using another approach)
 - T uses student interest in sports to illustrate an example of good writing
- d. Level 3 (High Quality)** - The teacher seizes an opportunity to enhance learning, building on a spontaneous event or students' interests, or successfully adjusts and differentiates instruction to address individual student misunderstandings. Using an extensive pedagogical repertoire and using school resources, the teacher persists in seeking effective approaches for students who need help.

Critical attributes are:

- i. The teacher seizes on a teachable moment to enhance a lesson.

- ii. The teacher conveys to students that she won't consider a lesson "finished" until every student understands and that she has a broad range of approaches to use.
- iii. The teacher's adjustments to the lesson, when they are needed, are designed to assist individual students

Possible Examples:

- The teacher stops a lesson midstream and says, "This activity doesn't seem to be working. Here's another way I'd like you to try it."
- The teacher incorporates a recent current sports event into an explanation of the rules of Football.
- T: If we have to come back to this tomorrow, we will; it's really important that you understand it

20. Assessment & Feedback

- a. **Level 0 (Unsatisfactory)** - Assessments are not congruent with learning objectives. There is no assessment criteria by which student performance will be assessed. There is no Assessment for Learning/ formative assessment incorporated in the lesson. Feedback is not given or of poor quality. Students do not engage in self- and/ or peer assessment.

Critical attributes are:

- i. Assessments do not match learning objectives
- ii. Assessment tasks lack criteria and exemplars of good quality work
- iii. There is no use of AfL/ formative assessment
- iv. Students receive no feedback or feedback is directed at class level or to single student
- v. Teacher does not ask students to evaluate own work or peer's work

Possible Examples:

- Teacher asks students to play a game of Netball without explaining what she expects to see from them and does not provide good exemplars.
- Teacher does not give constructive information to students on how to improve their work.
- Teacher does not allow students opportunity and time to reflect about their own work or peer's work

- b. Level 1 (Satisfactory)** - Assessments are partially congruent with learning objectives. Assessment criteria are given but without details. AfL/ formative assessment is used without thought on how they can complement the learning experience of students. Feedback is given but of inconsistent quality or mainly focused on task or process level. Students engage in self- and/ or peer assessment but without understanding the purpose of them.

Critical attributes are:

- i. Assessment match some of the learning objectives
- ii. Assessment tasks have criteria but not clearly defined and exemplar is used without much explanation
- iii. Use of AfL/ formative assessment for the sake of using it
- iv. Students receive feedback but not enough to guide towards future improvement of work
- v. Teacher makes minor attempts to engage students in self- or peer assessment

Possible Examples:

- Some of assessment used can elicit evidence of learning addressed by the learning objectives.
 - The assessment task criteria are vague or the teacher does not explain in details.
 - The teacher uses AfL/ formative assessment but without utilising the information solicited to improve students' learning
 - The teacher gives feedback to students but not enough to orient them to improve their future piece of work, e.g., praise, task feedback for this piece of work, etc.
 - Teacher gives time for students to reflect on own work or peer's work but does not walk through the students' reflections.
- c. Level 2 (Good Quality)** - Assessments are congruent with learning objectives. Assessment criteria are given with details and explanations and exemplars of work are provided. AfL/ formative assessment is used with specific purpose to complement the learning experience of students. Feedback is given or of good quality to improve future work. Students engage in self- and/or peer assessment.

Critical attributes are:

1. Assessments match the learning objectives
2. Assessment tasks have defined criteria and exemplars of good quality work are shown to students
3. Use of AfL/ formative assessment
4. Students receive feedback which is used to improve future work
5. Teacher gives times and opportunity for students to evaluate own work or peer's work

Possible Examples:

- Assessment used can elicit evidence of learning addressed by the learning objectives.
- Teacher explains the assessment criteria and provides exemplars of good quality work.
- AfL/ formative assessment is used and utilizes the information to improve students' learning.
- Teacher gives timely and constructive feedback to students to improve their future work.
- Teacher allows students opportunity and time to reflect about their own work or peer's work and walks through the reflection

- d. Level 3 (High Quality)** - Assessments are congruent with the learning objectives. Possibility of students co-constructing some assessment criteria and exemplars of work are provided. AfL/ formative assessment is used with specific purpose to complement the learning experience of students. Feedback of good quality is not just given by teachers but students are involved in soliciting feedback to improve their own work. Students take the initiative to engage in self- and/ or peer assessment.

Critical attributes are:

- i. Assessment match the learning objectives
- ii. Assessment tasks have clearly defined criteria and different exemplars of work is used with explanation with clear student understanding shown, with possibility of students co-constructing some criteria
- iii. Use of AfL/ formative assessment to elicit different learning outcomes

- iv. Students receive feedback and are also engaged in soliciting feedback from teacher
- v. Students engage students in self- or peer assessment

Possible Examples:

- Assessment used can elicit evidence of learning addressed by the learning objectives.
- The assessment task criteria are clearly defined and students engage in co-constructing of some criteria.
- AfL/ formative assessment is used and utilizes the information to improve students' learning
- The teacher gives timely and constructive feedback to students and students engage in soliciting feedback from teacher to improve own work
- Students reflect on own work or peer's work on own accord and uses information to improve work.

21. Knowledge Building Pedagogy

- a. **Level 0 (Unsatisfactory)** - The broad focus is on transmitting knowledge from the textbook and other prescribed sources to enable students to acquire facts and procedures imperative for assessment success. Teacher is clearly the epistemic authority in the classroom and teaching is controlled and tightly-scripted with barely any space for students' discursive or epistemic agency.

Critical attributes are:

- i. Teacher is the source of authoritative knowledge in the classroom and largely focuses on transmitting knowledge based on the prescribed curriculum.
- ii. Students passively learn foundational domain-specific knowledge with a focus on mastery of content.
- iii. Teacher sets the learning goals, establishes classroom norms, and ascertains the lesson focus and instructional activities.
- iv. Tasks and activities entail factual recall and routine procedural fluency in view of examination success and narrow performance outcomes.

Possible Examples:

- T tells the whole class the rules and gameplay of Softball and does not engage in any IRE or discussion with the class.

- T reinforces some procedures and tells her students, “These are basic things that will affect how well you play the game. If you don’t master these skills, then you won’t be able to contribute to your team.”
- b. Level 1 (Satisfactory)** - Teacher is primarily concerned with syllabus coverage, ensuring students’ grasp of skills and concepts in the discipline. Teachers offers space for students to explore ideas and make knowledge claims. Teacher encourages students’ metacognition by encouraging them to think about the what and how of their learning. Students occasionally steer the lesson focus and guide the nature of the activities they are engaged in.

Critical attributes are:

- i. Teacher does not relinquish her epistemic authority and focuses on knowledge transmission but offers some space for students to voice their opinions, explore and/or build on one another’s contributions.
- ii. Students learn about domain-specific norms, criteria and competencies, enabling them to make knowledge claims.
- iii. Teacher determines the learning goals and instructional activities, and students have space to propose or suggest alternatives to the pre-determined lesson focus, and the structure and sequence of instructional activities.
- iv. Tasks and activities are designed to ensure students’ conceptual understanding through examples and connections across procedures, concepts and contexts.

Possible Examples:

- Instead of merely telling her students that they can score one run by hitting a homerun, T gets them to think about putting more people on bases so that when the strongest hitter gets a home run, they will be able to score more runs. She then asks them to try and see if the strategy works.
- Students give peer feedback on their classmates’ Badminton game. T validates the feedback and encourages his students to reflect on the feedback given by their peers. T then asks the students to use the given feedback to revise and improve on their next games.

- T engages students in some reflexive talk about why the strategy is useful in the game, and students are then required to check and reflect on their own strategies.
- c. **Level 2 (Good Quality)** - Teacher lowers her epistemic authority, encouraging students to generate, contest and justify knowledge claims. Students engage in tasks that call for strategic thinking and application to new contexts. Students reflect on the what and how of their learning minus explicit teacher strategies. Students have a say in ascertaining their learning goals, use of resources, and the nature of learning activities.

Critical attributes are:

1. Teacher does not adopt an authoritative stance and acknowledges students' contributions providing them space to voice their opinions, build on one another's ideas, challenge views, and arrive at shared understandings.
2. Students generate, challenge and justify knowledge claims demonstrating awareness of the methods by which knowledge in the discipline is constructed and established.
3. Students ascertain the learning goals, structure and sequence of activities, and the resources needed in planning and engaging with the assigned tasks.
4. Tasks and activities require students to think strategically, consider alternatives, engage with complex problems, explore divergent pathways to arrive at the answer/solution, apply their knowledge in novel contexts, and/or use a range of representations for meaning-making.

Possible Examples:

- T refrains from telling his students the strategies of Baseball and asks them to engage in an activity that requires them to find out the different ways they can try to score runs and then draw a meaningful conclusion based on their observations.
- Students discuss about why particular strategies are more effective than others and enact them out to determine which ones suit their team's skillset the best.

- T tells students that they are playing Football today but that they can choose the activities and learning goals.

d. Level 3 (High Quality) - Teacher and students share epistemic and discursive agency in the classroom. Students play a role in defining their learning goals and monitoring progress through self-designed assessment criteria. Differences of views become occasions for advancing the understanding of classroom participants. Students engage in knowledge critique, apply their knowledge in authentic contexts, and make meaningful interdisciplinary connections. A pervasive knowledge building classroom culture becomes evident.

Critical attributes are:

- i. Teacher validates and values students' contributions, and students are empowered in legitimately contributing to the classroom knowledge work by exploring, building on and meaningfully engaging with one another's ideas with new understandings emerging beyond the lesson focus.
- ii. Students rigorously debate, argue and contest knowledge claims based on domain-specific norms, criteria and competencies as well as adopt a critical stance towards knowledge in the discipline.
- iii. Students exercise autonomy over their learning by ascertaining the learning goals, instructional activities, resources as well as the design of assessment tasks and the criteria for assessment of student work.
- iv. Tasks and activities demand students' sustained and critical engagement with atypical questions and non-routine problems, require students to draw on knowledge from other disciplines, and the activities relate and apply to authentic contexts and real-world problems.

Possible Examples:

- T asks students to set the learning objective and how would they want to go about fulfilling it. From a list of given topics, students choose the lesson focus: 'What are Adverbs?'. Students opt to watch a YouTube video that graphically illustrates the concept of Adverbs. Students then prefer to divide themselves into two groups: 'Verbs' and 'Adverbs' to play a game that tests their grammar and oracy skills.

- T develops the concept of ‘percentage’ by making connections to fractions and providing examples (through video) of usage in real-life. Students do group work based on how different representations of the given concepts impact the layman’s perceptions of buying and selling goods, and price inflation.
- In a lesson on ‘Dinosaurs’, T emphasises: “Don’t worry when I ask a question like that there’s no right or wrong answer, even scientists cannot prove if that can be done”; “Don’t be afraid, I’m not saying you are wrong”; “You don’t have to follow my answer, as I told you - you don’t have to follow my answer. I leave it to you - what is right, what is wrong.” Students, in groups, respond to two questions in their journal: Do you think it would be a good idea to bring back dinosaurs to life? Which extinct animal would you like to bring back to life should the scientists be able to do this?
- During a whole class discussion, some students question the authenticity and validity of the sources of Greek myth claiming that myths are fake and lack a scientific basis. Students propose further research.
- Based on their knowledge of ‘Congruency and Similarity’, students are required to estimate the width of a river. It requires students to engage in complex, non-algorithmic thinking to solve a problem for which there is no predictable, well-rehearsed approach or pathway, as explicitly suggested by the task.

22. Differentiated Instruction - Teacher addresses the students' different learner profiles by employing a variety of teaching strategies and learning tasks within the lesson. The differentiation may relate to any or a combination of Content, Process, Product and Environment.

- a. Level 0 (Unsatisfactory)** - There is no differentiation where teaching and learning tasks are applied uniformly to the whole class; the same teaching materials, handouts, worksheets and assignments are used for/by all students.

Critical attributes are:

- i. Content: T does not vary the content; text/content becomes the source of authoritative information.
- ii. Process: No variation in learning activities or strategies; T uses the same resources or materials to scaffold student understanding.

- iii. **Product:** All students work at the same level of task sophistication with similar performance criteria; students do not play a role in ascertaining the nature of their learning product or the pace at which they want to work.
- iv. **Environment:** T controls how students work - individually, in pairs, in small groups or as a whole class; Students have no opportunities to move around in the classroom or employ the available resources to suit their learning needs

Possible Examples:

- A group of students propose an activity they are interested in learning about but T emphasises the need to carry out the class as a whole.
 - T tasks all the students to attempt the same skills, regardless of the relatively low progress learners' struggles.
 - All students need to complete the assigned work in the same amount of time. T rebukes a student who requests for additional time.
- b. Level 1 (Satisfactory)** - There is an attempt to differentiate teaching and learning tasks for the different learner profiles within the class, typically with respect to either Process, Product or Environment. It is not evident that DI is effective in engaging most students and deepening their learning.

Critical attributes are:

- i. **Content:** T varies the content slightly perhaps drawing on students' varying interest; all students engage with the text/content in the same way.
- ii. **Process:** T varies learning activities or strategies regardless of individual students' needs and abilities; T varies the amount of scaffolding for different students by varying the resources and materials.
- iii. **Product:** Students have opportunities to work at different levels of task difficulty/sophistication with varying performance criteria; T determines the variations in learning outcomes for different students and the pace at which different students work.
- iv. **Environment:** T assigns students to groups based on similar competence levels for group work; Students use the learning resources and make use of the classroom space based on teacher guidelines.

Possible Examples:

- T asks Ss to surface what types of games they like to watch (e.g., Football, Rugby, Badminton) but asks Ss to engage in these games equally.
 - T offers additional learning support to one student, recognizing that he was uncomfortable asking questions in front of his peers.
 - T states the activities students should be working on, allowing more and less advanced students to work on previous or future activities, and/or providing them with extension activities.
 - T places students with others of similar ability for the relatively easier task; and for the more challenging work, she places students of similar ability.
- c. **Level 2 (Good Quality)** - There are skillful differentiated teaching and learning tasks for the different learner profiles within the class. It is evident that the differentiated instruction is effective in engaging most students and deepening their learning most of the time.

Critical attributes are:

1. Content: T varies the subject matter for selected students/groups of students; T varies how different students interact and engage with the content/text.
2. Process: T varies and adapts learning activities or strategies and uses a range of materials when instructing; T purposefully and strategically varies the resources and materials to scaffold student understanding in line with their emerging needs in the lesson.
3. Product: Evidence of T specially designing tasks which permit students to work at different levels of task difficulty or different success criteria; students have space to negotiate their learning product or the pace at which they want to work.
4. Environment: T facilitates students' self-selection of grouping for working on a task/activity; T arranges the classroom learning space and organises the resources to ensure all students can learn based on their needs and preferences.

Possible Examples:

- T organises different groups during PE lesson: the highest ability group immediately gets a ball and starts a game, another group begins a group practice where they pass the ball to each other in

quick succession, while the last low ability group requires assistance from the T to organise and figure out what to do.

- For the students who have a better understanding of the rules of the game, the T introduces more complex strategies for both the defense and attack to try against each other.

d. Level 3 (High Quality) - There are skillful differentiated teaching and learning tasks for the different learner profiles within the class. It is evident that the differentiated instruction is effective in engaging all students and deepening their learning all of the time.

Critical attributes are:

- i. Content: Students have opportunities to problematise the lesson content; students have a say in how they prefer to engage with the content/text.
- ii. Process: T varies and adapts learning activities or strategies and alters modes of instruction for individual or small groups of students in view of their needs and abilities; students request for or withdraw the scaffolds provided by T by gauging their own performance on the assigned task/activity.
- iii. Product: Evidence of T specially designing tasks which permit students to work at different levels of task sophistication and space for students to move across tasks of varying levels of difficulty at different points in the lesson; students play a key role in ascertaining the nature of their learning outcome and the pace at which they prefer to work.
- iv. Environment: Students are free to form their own work configurations based on their inclinations and preferences; Students have autonomy in the way they organise and use the learning space and resources in the classroom; Students may select and move between groups depending on their own learning pace.

Possible Examples:

- T records the learning goals on a whiteboard. She is able to note the progress every student has made and the areas which need improvement. While discussing the strategies students can use, she links the learning goals to their prior learning about other games.

- In an EL lesson, students are allowed to choose whether or not to work in groups, who they work with and how many people in a group, as well as the texts they analyse and the format of their presentations.
- T allows students to choose from a range of Carol Ann Duffy poems. Students then analyse their poem and present it to the rest of the class who provide feedback and note the similarities and differences between the poems. Clearly, T recognises that the key skills, techniques, themes and content can be learnt and understood through a range of Carol Ann Duffy poems.

DOMAIN SPECIFIC LEARNING EXPERIENCES [as per subject-domain]**23 Sequencing Learning**

Elements:

- Transitions between tasks
- Learning cues to facilitate learning
- Adequate time to facilitate the practice of skill(s) and/or concept(s) taught

Indicators:

- Transition between tasks: Transition between tasks are smooth, do not require to be set up again or require new equipment.
- Learning cues: T uses learning cues to scaffold students' learning that is accurate, brief, in a logical sequence and appropriate to the students' skill and developmental levels.
- Adequate time: T does not have to cut short practice or students all have an equal amount of time to practice.

a. Absent/Unsatisfactory (Level 0)

Transition between tasks are not smooth and require students to wait around while the next task is being set up. The learning cues given by the T are inappropriate to the students' skill and developmental levels. Insufficient time is set aside for all students to practice the skills taught during lesson.

Critical Attributes

- There are little to no smooth transitions for inter and intra-tasks during the lesson.
- T does not use learning cues to help facilitate learning or learning cues are confusing (e.g., cues are inaccurate; long-winded; used in an illogical sequence; and inappropriate to the students' skill and developmental levels).
- T does not plan for adequate time to facilitate the practice of skill(s) and/or concept(s) taught.

Possible Examples

- T has the students help set up cones to practice their dribbling skills in groups of four. Once the drill is over, he has the students practice their shooting, which requires the students to remove the cones and to set up the goal posts and nets.

- T tells students, “When you hit the shuttlecock, you want to hit it long to the back of the court but not too long or it will go out. Or you can hit it to the corner. Or the side if the opponent isn’t there.”
- T spends half the lesson scolding the students for being rude and does not have enough time to let them practice.

b. Satisfactory (Level 1)

T is successful at some attempts to transition between tasks during the lesson. There is evidence that the T is attempting to use learning cues to scaffold the learning of the students but it is not successful. T is unable to utilise the allotted time for practice due to unforeseen circumstances.

Critical Attributes:

- There are some smooth transitions for inter and intra-tasks during the lesson.
- Teacher attempts to use learning cues to help facilitate learning but is not successful (e.g., cues are accurate; brief; used in a logical sequence; and appropriate to the students' skill and developmental levels).
- Teacher plans for adequate time to facilitate the practice of skill(s) and/or concept(s) taught but is unable to achieve it due to circumstances.

Possible Examples:

- T attempts to use learning cues to help students direct their hits during Baseball but students were having trouble just making contact with the pitch.
- T has planned enough time for students to do a warm-up drill involving passing, a group exercise to practice some strategies and the second half of the lesson for everyone to take part in a game. However, the students were released late from their previous class and had to start the class 10 minutes late which left the T little time to achieve her lesson objectives.

c. Good Quality (Level 2)

T has clearly prepared for smooth transitions between tasks with most of them taking place, save one or two hiccups. It is evident that the T know when to use learning cues somewhat effectively. T has planned for adequate time to facilitate the practice of skill(s) and/or concept(s) and is mostly able to achieve it.

Critical Attributes:

- Most of the transitions for inter and intra-tasks during the lesson are smooth.

- T knows when to use learning cues somewhat effectively to help facilitate learning (e.g., cues are accurate; brief; used in a logical sequence; and appropriate to the students' skill and developmental levels).
- T plans for adequate time to facilitate the practice of skill(s) and/or concept(s) taught and is mostly able to achieve it.

Possible Examples:

- Most of the transitions between tasks are smooth with students moving from individual practice to group practice smoothly, save for a few students who seem ignorant of what to do.
- As the students are practicing their lay-up skills in Basketball, T says “Try to push off with the same leg as your shooting hand for a smoother motion.”

d. High Quality (Level 3)

T has clearly prepared for smooth transitions between tasks in order to positively impact students' learning progression. It is evident that the T know when to use learning cues effectively. T has planned for adequate time to facilitate the practice of skill(s) and/or concept(s) and is able to achieve it.

Critical Attributes:

- The transitions of the inter- and intra-tasks during the lesson are smooth and positively impact students' learning progression.
- Teacher knows when to use learning cues effectively to help facilitate learning throughout the lesson (e.g., cues are accurate; brief; used in a logical sequence; and appropriate to the students' skill and developmental levels).
- Teacher plans for adequate time to facilitate the practice of skill(s) and/or concept(s) taught and is able to achieve it T activates prior knowledge of the theme/topic and the type of text.

Possible Examples:

- Students move from pair passing practice to group passing practice and are able to make the connection between what they were practicing first and what they did next.
- After students attempt the group practice, T asks, “...Why do you have to move before you receive the ball?...How do you know when to move?...What signs tell you so?”

23.2 Activating Prior Knowledge

Elements:

- Students' life experiences
- Students' previous learning
- Students' preconceptions of concepts or ideas

Indicators:

- T's activation of students' prior knowledge
- T draws on student's preconceptions

a. Absent/Unsatisfactory (Level 0)

There is no evidence that T activates student's prior knowledge or preconceptions.

Critical Attributes:

- T does not activate students' prior knowledge (i.e., students' life experiences and previous learning).
- T does not draw on students' preconceptions (i.e., students' prior understanding of concepts or ideas which may support, or impede, new learning).
- **Possible Examples:**
- When starting a lesson on Basketball, T does not activate the students' prior knowledge on group games or skills.

b. Satisfactory (Level 1)

T activates students' prior knowledge and preconceptions but only during the lesson introduction.

Critical Attributes:

- T activates students' prior knowledge only during the lesson introduction (i.e., students' life experiences and previous learning).
- T draws on students' preconceptions only during the lesson introduction (i.e., students' prior understanding of concepts or ideas which may support, or impede, new learning)

Possible Examples:

- At the start of a lesson on Basketball, T asks the class “Ok, who here has played Basketball before? Do you know how to dribble or what a lay-up is?” After this, T does not activate prior knowledge for the rest of the lesson.

c. Good Quality (Level 2)

T activates students’ prior knowledge and preconceptions at multiple points during the lesson.

Critical Attributes:

- T activates students' prior knowledge on multiple occasions during the lesson (i.e., students' life experiences and previous learning).
- T draws on students' preconceptions on multiple occasions during the lesson (i.e., students' prior understanding of concepts or ideas which may support, or impede, new learning).

Possible Examples:

- T activates prior knowledge when speaking with the class after each activity but does not do so consistently during the lesson.

d. High Quality (Level 3)

T activates students’ prior knowledge and preconceptions consistently across the lesson.

Critical Attributes:

- T incorporates students' prior knowledge throughout the lesson (i.e., students' life experiences and previous learning).
- T draws on students' preconceptions throughout the lesson (i.e., students' prior understanding of concepts or ideas which may support, or impede, new learning).

Possible Examples:

- T consistently links the students’ previous learning about maximizing space in Badminton to spreading out in Tchoukball.
- T questions students’ preconceptions about the importance of practicing 2v1 drills in Floorball as he walks around. He maintains this throughout the whole lesson.

Elements:

- Activity Practice (moving around)
- Developmentally appropriate progression tasks
- Space and/or equipment
- Affective learning opportunities

Indicators:

- Time spent on activity practice (moving around) by students
- Percentage of students involved in the activity practice
- Presence of developmentally appropriate progression tasks to scaffold learning
- Sufficient space and/or equipment
- Affective learning opportunities incorporated into the lesson

a. Absent/Unsatisfactory (Level 0)

Lack of time for students to be active and experience physical movement. Tasks are not developmentally appropriate for students to scaffold their learning. T has not prepared enough space and/or equipment for students.

Critical Attributes:

- Students are involved in activity practice for less than 50% of lesson time.
- There are no developmentally appropriate progression tasks to scaffold learning and practice combination of skills.
- There is insufficient space and/or equipment to engage students for maximal practice.
- There are no affective learning opportunities incorporated into the lesson.

Possible Examples:

- T spends the first half of the lesson showing a video on Rugby and the students only have less than half of a lesson to try out the new game.
- During a Volleyball lesson as the students are learning how to serve, T does not explain how to return a serve or the proper technique to do so.
- With insufficient Basketball nets, students have to queue up to practice their lay-up drills.
- T does not address students' unwillingness to take part in the lessons.

b. Satisfactory (Level 1)

The majority of the students in the class take part in activity practice for the majority of the lesson time. T includes a few developmentally appropriate

progression tasks for students to practice a combination of skills. T attempts to incorporate a few affective learning opportunities into the lesson.

Critical Attributes:

- The majority of students are involved in activity practice for at least 50% of lesson time.
- There are a few developmentally appropriate progression tasks to scaffold learning and practice combination of skills.
- There is sufficient space and/or equipment to engage students for maximal practice, but it is not utilized to its maximum efficiency.
- There are a few affective learning opportunities incorporated into the lesson.

Possible Examples:

- As Netball only allows 2 teams of 7 players, the majority of the class is involved in the game for most of the lesson, with the exceptions of the substitutes, who only take part when they are subbed in.
- In Softball, T has the students first practice throwing to each other to familiarize themselves with the ball and gloves, and then followed that with the students practicing throwing over greater distances.
- T has students gather in a smaller area to practice to avoid being in the sun.
- T praised the effort of one student once throughout the whole lesson.

c. Good Quality (Level 2)

The whole class is involved in activity practice for the majority of the lesson. While the T has introduced some developmentally appropriate progression tasks, they are executed in isolation from each other. T incorporates some affective learning opportunities into the lesson.

Critical Attributes:

- All students are involved in activity practice for 50% to 65% of lesson time.
- There are some developmentally appropriate progression tasks to scaffold learning and practice combination of skills; however, they are executed in isolation from each other.
- There is sufficient space and equipment to engage students for maximal practice, but it is utilised to its maximum efficiency to a certain extent.
- There are some affective learning opportunities incorporated into the lesson.

Possible Examples:

- All the students are involved in the Tchoukball game for more than 50% of the lesson time.
- Students are tasked to practice bouncing a basketball stationary. They then break up into groups and practice passing to each other. The T then has everyone come back together later on in the class to practice bouncing the basketball up and down the court.
- T encourages students to take part on multiple occasions during the class.

d. High Quality (Level 3)

All students are involved in activity practice for more than 65% of the lesson time. Multiple developmentally appropriate progression tasks, which build on one another, are present in the lesson. T utilises the many affective learning opportunities to educate his students.

Critical Attributes:

- All students are involved in activity practice for 65% to 75% of lesson time.
- There are multiple developmentally appropriate progression tasks, which build on one another to scaffold learning and practice combination of skills.
- There is sufficient space and equipment to engage students for maximal practice which is utilised to its maximum efficiency.
- There are many affective learning opportunities incorporated into the lesson.

Possible Examples:

- All the students are involved in the Tchoukball game for more than 65% of the lesson time.
- Students are tasked to practice bouncing a basketball stationary. They then move to practice dribbling the basketball up and down the court. The T then has the students get into pairs to practice dribbling for 4 steps before passing to their teammate and then receiving the ball back from them.
- T has the students spread out across the whole Basketball court to maximise their practice space.

23.4 Providing Clear Explanation

Elements:

- T instruction
- T demonstration of skills

Indicators:

- T's instructions are clear and concise.
- T provides effective demonstration of skills

a. Absent/Unsatisfactory (Level 0)

Students are confused or bored by the T's instructions. Students are not provided with a demonstration on what they are supposed to do or are given incorrect demonstrations.

Critical Attributes:

- Teacher's instructions are unclear and long-winded.
- Teacher does not provide any demonstration at all or provides incorrect demonstrations of skills.

Possible Examples:

- T goes through the activities for the lesson "Ok, today we are doing Tchoukball. First, you will need to set up the nets but you don't do that first. We will be playing in teams so later on, when I say so, you will split into teams. Not yet ah. Ok, go warm-up first, then split into teams. Just make sure you have teams of 10."
- T is demonstrating how to hit a ball in Softball but is not in the correct stance.

b. Satisfactory (Level 1)

T's instructions can sometimes be long or confusing. At the start of the lesson, the T demonstrates what she wants them to learn during today's lesson.

Critical Attributes:

- T's instructions are sometimes unclear and long-winded.
- T provides effective demonstrations of skills at the start of the lesson with a few learning cues reinforced during the lesson.

Possible Examples:

- T demonstrates at the start of the lesson what the 2v1 activity should look like and reinforces it at several points during the lesson.

c. Good Quality (Level 2)

T's instructions are mostly clear and concise during the lesson. T provides demonstration of what she wants them to learn at multiple points during the lesson.

Critical Attributes:

- T's instructions are mostly clear and concise.

- T provides effective demonstrations of skills at different points in the lesson with some learning cues reinforced during the lesson.

Possible Examples:

- T says “Ok, so today, we are starting to learn how to play Basketball. We will start off by learning how to bounce the ball with each hand, then later on, we will learn how to dribble.”
- In a Netball lesson, T provides a demonstration of how to shoot accurately with the netball and correct students’ errors during the practice. However, she does not reinforce the learning cues throughout the lesson.

d. High Quality (Level 3)

T’s instructions are clear and concise during the lesson, which allows the students to move quickly between tasks. T provides demonstration of what she wants them to learn at multiple points during the lesson, with the appropriate learning cues.

Critical Attributes:

- T's instructions are clear, concise and allow students to move quickly into tasks.
- T provides effective demonstrations throughout the lesson with the appropriate learning cues reinforced throughout the lesson.

Possible Examples:

- After concluding the first practice activity on bouncing the ball, T says “Ok, stop, listen to me. Now I want you to dribble with your dominant hand up and down the court. Go!” “Ok, switch hands, go!” “Both hands, go!”
- In a Floorball lesson, T provides a demonstration of how to dribble with the stick and ball at the start of the activity and also to correct students’ errors during and after the activity.

27 Facilitating Collaborative Learning

Elements:

- Collaborative learning

Indicators:

- Collaborative learning (in pairs/large groups)

a. Absent/Unsatisfactory (Level 0)

Students are not given the opportunity to interact with their peers and develop their own learning.

Critical Attributes:

- T does not facilitate collaborative learning, either in pairs or in larger groups.

Possible Examples:

- Students only engage in solo practice and do not interact with their peers during the lesson. For example, T only has the students do some individual running around the track or practice juggling a shuttlecock.

b. Satisfactory (Level 1)

Student collaborative learning is attempted during the lesson to allow students to surface answers to any challenges they may face.

Critical Attributes:

- T attempts to facilitate some collaborative learning during the lesson, either in pairs or in larger groups.

Possible Examples:

- T attempts to have students collaborate during the lesson in groups but students are more interested in talking among themselves and not doing the activity.

c. Good Quality (Level 2)

T is successful in her attempts to facilitate collaborative learning during the lesson, either in pairs or in larger groups.

Critical Attributes:

- T facilitates collaborative learning throughout the lesson, either in pairs or in larger groups

Possible Examples:

- During a group practice on passing with one student standing in the middle (as an opponent), the T facilitates the group's learning on how to pass quickly to each other without the student in the middle intercepting the ball.

d. High Quality (Level 3)

Students are encouraged to perform peer-observation and provide feedback to their classmates to solve problems collaboratively.

Critical Attributes:

- T facilitates collaborative learning throughout the lesson, either in pairs or in larger groups; students are encouraged to take initiative to perform peer-observation and solve problems collaboratively in groups.

Possible Examples:

- T has half the class (grouped in pairs) play a Badminton game, while the other half observes them and provides feedback on how they could have done better and issues to look out for.

28 Concluding the Lesson

Elements:

- Consolidation of learning
- Reviewing of learning
- Assessment of learning

Indicators:

- Consolidation at the end of a lesson or a segment of it
- Opportunities to review learning
- Summaries of key learning points of the lesson
- Assessment of students' (class) learning
- Connection to subsequent lessons

a. Absent/Unsatisfactory (Level 0)

Students are not provided a summary or consolidation of their learning at the end of the lesson. Students are not given the opportunity to recap what they have been doing and how it ties in with their future lessons.

Critical Attributes:

- T does not help students consolidate their learning at the end of a lesson or a segment of it.
- T does not provide opportunities for students to review their learning nor to summarise the key learning points of the lesson.
- T does not provide any assessment of the students' (class) learning nor make any connections to the subsequent lessons.

Possible Examples:

- At the end of the lesson, T asks the students “Ok, that is all for today. Please put the equipment back and hurry up to get to your next lesson.”
- Once an activity is completed, T says “Ok, stop what you are doing. We need to move on to the next activity now. Put those balls away. You only need 1 for the next activity.”

b. Satisfactory (Level 1)

Consolidation of learning only occurs at the end of the lesson. T only provides a few opportunities for students to review their learning. There is some assessment of the students' (class) learning but not connection to any subsequent lessons.

Critical Attributes:

- T only consolidates students' learning at the end of a lesson.
- T provides few opportunities for students to review their learning and only summarises a few key learning points of the lesson.
- T provides some assessment of the students' (class) learning but does not make any connections to the subsequent lessons.

Possible Examples:

- At the end of the lesson, T says “Ok, what did we learn today?”

c. Good Quality (Level 2)

T is successful in her attempts to facilitate collaborative learning during the lesson, either in pairs or in larger groups.

Critical Attributes:

- T consolidates students' learning at both the end of a lesson and segments of it.
- T provides some opportunities for students to review their learning and summarises most of the key learning points of the lesson.
- T provides some assessment of the students' (class) learning and makes some connections to the subsequent lessons.

Possible Examples:

- After each activity and at the end of the lesson, T facilitates students' learning by consolidating what they have learnt that day.
- T says “Ok, you've all done well today and mastered your dribbling. Girls, you all still need some work. Once you get better, then the rest of the unit will be more fun.”

d. High Quality (Level 3)

Students' are encouraged to reflect on their own learning and assess themselves at the end of each activity and the lesson. Students are given ample opportunities to review their learning and consolidate their learning. T provides a detailed assessment of their learning, tying it to what they are going to be learning in the coming lessons.

Critical Attributes:

- T helps students to consolidate their own learning by encouraging self-reflection and assessment at the end of a lesson and after segments of it.
- T provides ample opportunities for students to review their learning in depth and helps to summarise each key learning points of the lesson.
- T provides detailed assessment of the students' (class) learning, while making connections to the subsequent lessons.

Possible Examples:

- T asks the students “So what went well for you all today? What went wrong? How do you think it will help you when you play a game of Floorball?”
- T tells the students “Good, I like what this group did, they spread themselves out across the court to maximise their coverage and to make sure that they had more space to receive the ball, instead of crowding around the goal. But what else could you all have done to improve?”

29 Setting Expectations and Routines

Elements:

- Clear expectations and routines
- Appropriate or inappropriate behaviour
- Consequence of actions

Indicators:

- T sets clear expectations and routines
- T shapes students' understanding of appropriate/inappropriate behaviour
- T explains what the consequences of the students' actions

a. Absent/Unsatisfactory (Level 0)

Students are not instructed on how they are supposed to behave. There are little to no consequences to inappropriate behaviour.

Critical Attributes:

- T does not set clear expectations and routines as part of his/her lesson.
- T does not shape students' understanding of appropriate or inappropriate behaviour, and the consequences of their actions.

Possible Examples:

- At the start of the class, students do not greet the T as he does not greet them first.
- When a student hits another student, the T just ignores what he saw.

b. Satisfactory (Level 1)

There is a lack of consistency in the T's enforcement of expectations, routines and appropriate behaviour.

Critical Attributes:

- T has established some clear expectations and routines as part of his/her lesson, but is unclear or does not enforce his/her expectations on the class.
- T attempts to shape students' understanding of appropriate or inappropriate behaviour, and the consequences of their actions but is not consistent during the lesson

Possible Examples:

- T greets the class but only a handful returns his greeting. He chooses to ignore the quality of response and begins his lesson.
- When one student kicks the volleyball with his foot, the T admonishes him. However, when another student does the same, the T ignores what happened or tells him off in a softer tone.

c. Good Quality (Level 2)

T has established his clear expectations and routines and attempts to reinforce them during his class. There are also attempts to shape students' understanding of appropriate and inappropriate behaviour, with the T trying to be consistent throughout.

Critical Attributes:

- T has established clear expectations and routines as part of his/her lesson and attempts to enforce his/her expectations on the whole class.
- T shapes students' understanding of appropriate or inappropriate behaviour, and the consequences of their actions throughout most of the lesson.

Possible Examples:

- When the T greets the students, only a handful respond. He greets them again with more force and more students respond this time. As the majority of the class has put more enthusiasm into their response, he moves on with the lesson.
- T shapes his students' understanding of appropriate and inappropriate behaviour and is mostly consistent throughout the lesson.

d. High Quality (Level 3)

Clear expectation and routines have been well-established and students recognise and acknowledge the T's authority. Students do not need reminding of what the T's expectations are. T is consistent with how they respond to appropriate and inappropriate behaviour.

Critical Attributes:

- T has established clear expectations and routines as part of his/her lesson, and enforces his/her expectations, as and when necessary, throughout the whole lesson as well as for the whole class.
- T shapes students' understanding of appropriate or inappropriate behaviour, and the consequences of their actions throughout the lesson consistently for everyone.

Possible Examples:

- As the students approach the lesson area, they separate into their pre-assigned groups and stop talking once the T blows his whistle.
- All the students are treated equally throughout the course of the lesson.

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