

USING TALLY COUNTER TO COUNT HEART RATE IN PHYSICAL FITNESS ACTIVITY: AN INNOVATION APPROACH

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Abstract

This paper presents on the significance of Physical Education teachers in the diffusion of thinking on innovative, alternative activities to develop the physical literacy of their students by making Physical Education more inclusive, enjoyable and putting new ideas into practice in Malaysian schools. Primary students of this study having problem to count heart rate (beat) during physical fitness activity. They miscalculated heart rate and almost a third of the class continue to struggle to do simple tasks such as counting very fast and got lost in counting. The case study design was to determine if students are taking their heart rate accurately and the reliability of using tally counter to count heart rate for fitness activity in Physical Education lessons. Six students of Year 5 at selected Malaysian primary schools were involved in the study. Students were asked to count heart rate at the carotid area manually for first trial and using tally counter for second trial to record their resting and exercise heart rate. The findings showed significant differences in counting heart rate by using tally counter. The value of the standard deviation was smaller $SD=7.61$ for resting heart rate and $SD=10.17$ for exercise heart rate. The Cronbach's Alpha reliability value of using tally counter to measure resting and exercise heart rate was $\alpha=.932$. Drawing on the case study investigation and classroom experience, the teacher testified that using tally counter could assists student in counting heart rate accurately. Her idea was to help *students develop or improve counting skills*, place value understanding and sense of *numbers*. Despite the challenges, it was also to motivate students to engage and participate in fitness activity. The implications on this study is that the Malaysian education policy makers and curriculum designers need to explore new concepts in teaching and learning of Physical Education, arguing for important changes in curriculum design.

Keywords: Innovation, Physical Education, physical fitness

1. INTRODUCTION

Innovation is a process that involves the changing of context which in turn generates imagination and creativity (Eveleens, 2010). Innovation in education is about promoting new or alternative educational models and innovative platforms for knowledge creation, dissemination and application Stidder & Binney, (2013). It is vital for as to produce outstanding students for the future development of the nation especially for Malaysia. Creative and innovative thinking are resources that every successful student needs. Deputy

Prime Minister and also the Malaysian Education Minister, Tan Sri Muhyiddin Yassin said that the transformation of the school curriculum based on creativity and innovation will make learning fun and no longer examination-oriented (Najiah, 2010).

The Standards-based Malaysian School Curriculum requires teachers to apply classroom strategies which promote creative and critical thinking and innovation among students. Teachers need to carry out teaching and learning activities which are student-centered, provide opportunities for students to explore and test their hypotheses and ideas, solve problem and most importantly provide a fun learning environment. Teachers need to be sensitive to students' learning needs and be able to identify learning styles which suits them best. The curriculum will therefore recognize that the students have different learning needs. Teachers can make teaching process better and may find ways to make teaching interesting to students. However, innovation requires openness of school principals and teachers to looking at problems in multiple perspectives.

Physical Education in Malaysian Schools is open to criticism that it is essentially non-academic. The focus of teaching has frequently concentrated on school students developing technical expertise for sports. Learning has been both reduced and limited to psychomotor performance; an educational outcome emphasizing the learning of fundamental movements, motor and sport performance skills.

Therefore, a shift from transmission method of instruction inherent in the traditional Physical Education approach to a more innovative teaching approach should be introduced. A curriculum model that established Physical Education pedagogy in terms of the skills, knowledge and understanding that were fore grounded in teaching and learning, and in parallel, the ways in which teaching could most effectively engage with the new learning environment and enjoy playing sports.

As educators, it is our responsibility to put the fun back into Physical Education and sports by changing the way that we teach, creating better team work and engagement, and encouraging students to be more resilient when they participate in sports. It is our duty to create fun, safe and enjoyable learning environments so that students enjoy the feeling of physical activity, which they will do when they are both challenged and having fun.

Innovations in Physical Education and sports have been practice internationally. In the United States (NASPE & American Heart Association, 2012) for example, Physical Education teachers are using innovative ways to battle the obesity crisis.

The Georgia Student Health and Physical Education Program (SHAPE) promote childhood fitness and build a culture of wellness among the state's youth, under the leadership of Georgia Governor Nathan Deal (President's Council on Fitness, Sports and Nutrition, 2014). The goal is to get 100 percent of schools in Georgia to participate in the SHAPE program in an effort to pave the way for more than one million Georgia school children to improve their physical fitness and classroom performance.

The study was designed to challenge students' focus group from Master of Education (Sports Science Education) program from Sultan Idris Education University, to defuse on innovation learning environment in physical education and sports curriculum at schools.

Based on Futuristic Curriculum Project, students' focus groups were asked to implement and testify the curricular innovation that inspires students to be active and enjoy Physical Education lesson.

1.1. Problem Statements

In Malaysia, physical activities and fitness testing among school children was compulsory, and was a part of the Physical Education programmed. Students from Year 4 to 6 (age 10 to 12); and Form 1 to 5 (age 13 to 17) are required to sit for the National Physical Agility Standard Test to determine the fitness level of students based on a few physical tests (Ministry of Education, 1992). Among the elements of the test is taking the pulse rate of each student to determine cardiovascular endurance level.

Pulse rate or usually called heart rate, refer to the number of times of heart beats each minute (BPM). We check our pulse rate by counting the beats in a set period of time (at least 15 to 20 seconds) and multiplying that number to get the number of beats per minute.

Primary students of this study having problem to count heart rate (beat) during physical fitness activity. They miscalculated heart rate and almost a third of the class continue to struggle to do simple tasks such as counting very fast and got lost in counting.

Studies on population-based research have used self-report measures of physical fitness activity; but young children are unable to accurately self-report their heart rate through physical fitness activity (Sirard and Pate, 2001).

1.2. Purpose of the Study

This study was to determine if students are taking their heart rate accurately and the reliability of using tally counter to count heart rate for fitness activity in physical education lessons. This study introduced the use of

tally counter to measure heart rate during physical fitness activity.

1.2.1 Research Questions

- a. How accurate that the students are taking their heart rate using tally counter?
- b. How much reliability of using tally counter to count heart rate for fitness activity in Physical Education lessons?
- c. Does the innovation approach motivate students to engage and participate in fitness activity?

2. METHODOLOGY

The study was carried out by students' focus group from Master of Education (Sports Science Education) program from Sultan Idris Education University, to defuse on innovation learning environment in Physical Education and sports curriculum at schools.

The study was conducted through pre experimental design, the one short case study on six volunteered Year 5 male students who have difficulties in counting their heart beat at selected Malaysian primary school.

2.1 First Trial

Students were asked to count heart rate at the carotid area manually to record their resting heart rate. The counting was made while standing. Method to measure heart rate at the carotid area was by measuring it at the neck (carotid pulse), by placing index and middle finger gently on one side of the neck, below jaw bone and halfway between main neck muscles and windpipe.

Using a stopwatch, students were asked to count their heart rate for 20 seconds than multiply by 3 (using calculator) the number of beats to find beats per minute (BPM). Record the results and repeat for three times. Mean resting heart rate were recorded for data analyses.

After having warming up activity, students do shuttle run in a slow pace (low intensity) for a period of 5 minutes and gradually increase the speed of running to another 3 minutes before finishes running at full speed at the distance of 20 meters.

Immediately after the running activity, students were asked to count heart rate at the carotid area manually while standing to record their exercise heart rate result.

Students were given a rest for about 10 minutes and to ensure they have fully rest, before repeat the activity for a second trial.

2.2 Second trial

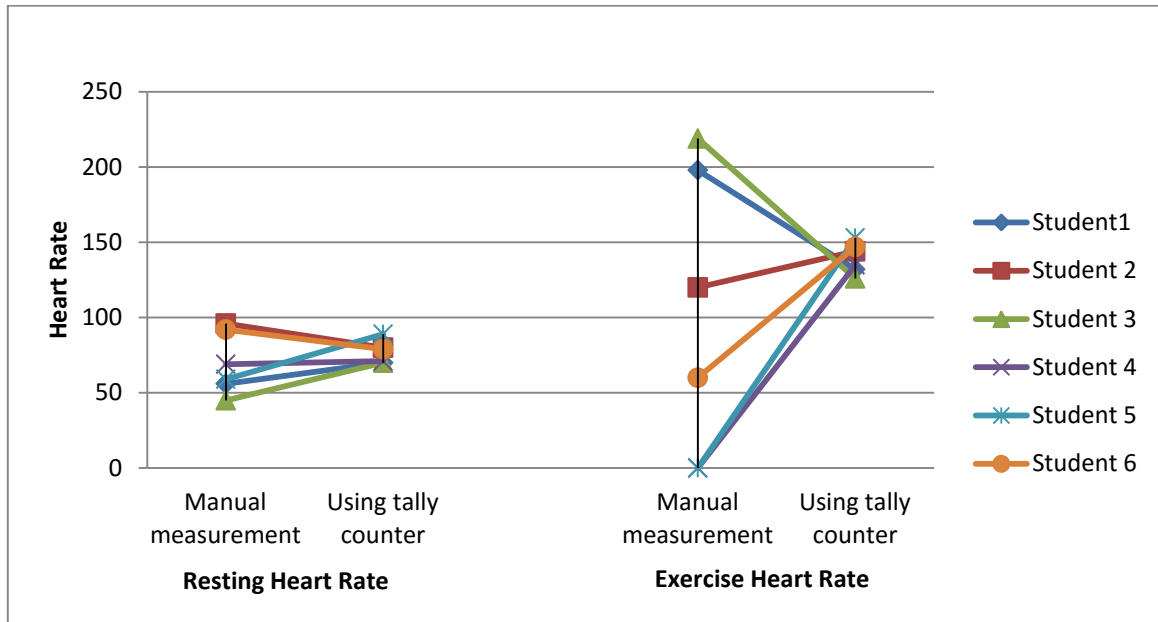
Students were again, asked to count their resting heart rate at the carotid area while standing. But at this trial, students were asked to close their eyes for concentration to tap on the tally counter following with their heart beat to record their resting heart rate. The same procedure applied to count heart rate and record the results for three repetitions. Mean resting heart rate were recorded for data analyses.

After having warming up activity, the similar procedures applied. Students do shuttle run in a slow pace (low intensity) for a period of 5 minutes and gradually increase the speed of running to another 3 minutes before finishes running at full speed at the distance of 20 meters.

Immediately after the running activity, students were asked to count heart rate at the carotid area while standing using tally counter to record their exercise heart rate. Again, students were asked to close their eyes for concentration to tap on the tally counter following with their heart beat to record their exercise heart rate.

3. RESULTS AND DISCUSSIONS

Generally, the participating students were very receptive to trying out the physical fitness activity and counting their heart rate. The students were able to regulate their learning process on the counting performance (achievement) using tally counter. Data analysis (Graph 1 and Table 1) showed the overall students' achievement on the measuring of resting and exercise heart rate through manual counting and tally counter through physical fitness activity.



Graph 1. Measure resting and exercise heart rate through manual counting and tally counter

Table 1. Mean and standard deviation

	Mean	Std. Deviation
Manual measurement of resting heart rate	69.5	20.50
Using tally counter to measure resting heart rate	76.5	7.61
Manual measurement of exercise heart rate	99.5	95.66
Using tally counter to measure exercise heart rate	139.5	10.17

The findings showed significant differences in counting heart rate by using tally counter. The value of the standard deviation was smaller SD=7.61 for resting heart rate and SD=10.17 for exercise heart rate.

The Cronbach's Alpha reliability value of using tally counter to measure resting and exercise heart rate is $\alpha=.932$.

The questionnaire (Table 2) related to motivation and participation in physical fitness activity using tally counter was analyzed descriptively.

Table 2. Percentages of students' motivation towards the effectiveness of using tally counter to measure resting and exercise heart rate in physical fitness activity (N=6)

Statements	%		
	Yes	No	Not Sure
I feel motivated to engage and participate in physical fitness activity.	100	0	0
The physical fitness exercises help me get ready emotionally for the following Physical Education lesson.	83.3	16.7	0
I feel that using tally counter motivate me to engaged in the physical fitness exercises to count heart beat.	100	0	0
I felt confident that using tally counter in the physical fitness exercises increased my counting skills.	100	0	0
I appreciate my healthiness that related to physical fitness exercise.	66.6	16.7	16.7
Physical fitness exercise stimulated me to involve in active life style.	66.6	16.7	16.7
I feel self-expression and confidence to participate in physical education class.	100	0	0

The enthusiastic participation of the students in the physical fitness exercise by using tally counter reflected their belief in the effectiveness of participating in physical education lessons. As a result of this study, the teacher feels more confident about students' engaged and participation in her Physical Education class for the National Physical Agility Standard Test.

Drawing on the case study investigation and classroom experience, student's focus group testified that the demand for curricular innovation supports the need for action-oriented learning environment. Curricular innovations tended to be implemented at schools and curricular trends appear to move towards student centered learning.

3.1 Teacher's Testimony

I found that using tally counter could assists student in counting heart rate accurately.

I found that it's the way that student count — whether the counting procedure forces them to count to the numbers in the tally counter — that yields real benefits in counting numbers. What's most important is that students be able to compute in a fast pace using tally counter.

My idea was to help students develop or improve counting skills, place value understanding and sense of number. Despite the challenges, it was also to motivate students to engage and participate in fitness activity.

As a teacher, my responsibility is to enable the transformation of passive students into curious, interested and independent persons through alternatives methods and innovation in teaching.

4. DISCUSSIONS

The studies confidently identified effective steps in the preparation for, and the transition to, new learning spaces or other innovative learning environment. It also provides a detailed and insightful mapping of how teachers and students encountered innovative learning environment by identifying significant engagement with collaborative and flexible teaching.

The art of teaching is not just to enable students to gain knowledge and skills, but also to arouse their interest and curiosity in the subject and instill in them the desire to discover more and to keep learning. The traditional style of teaching Physical Education placed the teacher at the centre stage lecturing to the students with no consideration of their individual learning needs. In contrast, modern teaching pedagogy shifts the attention to the students and their learning styles. With this change, students become active learners who are exposed to multiple ways of learning. Physical Education teachers have to find innovative ways to perform their traditional duty of delivering facts and information to their students on the one hand, while shaping students' emotions, attitudes and values, as well as enhancing their abilities and creativity, on the other.

The findings have revealed that in relation to challenges and learning environment opportunities, student's focus group supported curriculum and pedagogical innovation and they were aware of the national education's agenda on enhancing innovation in education. The implications on this study is that the Malaysian education policy makers and curriculum designers need to explore new concepts in the teaching and learning of Physical Education and sports, arguing for important changes in curriculum design.

5. CONCLUSION

The demand for curricular innovation supports the need for action-oriented learning and work-based learning. What do we teach and what we should teach. In conclusion, although these projects seem to revolutionize the education system in total, there will be more benefit to the nation as a whole and such efforts can realize the country's vision to be developed by the year 2020. These so-called education visions will generate innovation and creativity in the school and higher institution education and also the management system to produce culture of lateral thinking (innovative learning environment) inculcation with the future culture of excellence.

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