THE EFFECT OF PEDAGOGICAL MODELS TOWARDS BADMINTON LESSON CONTENT LEARNING PROCESS AMONG MALAYSIAN STUDENTS

Sanmuga NATHAN,
Universiti Pendidikan Sultan Idris, Malaysia
sanmuga@fsskj.upsi.edu.my

Abd. Rahim MOHD SHARIFF,
Universiti Pendidikan Sultan Idris, Malaysia
abd.rahim@fsskj.upsi.edu.my

Ahmad HASHIM,
Universiti Pendidikan Sultan Idris, Malaysia
ahmad@fsskj.upsi.edu.my

Jaffry ZAKARIA,
Universiti Pendidikan Sultan Idris, Malaysia
jaffry@fsskj.upsi.edu.my

Mohd Izwan SHAHRIL
Universiti Pendidikan Sultan Idris, Malaysia
izwan.shahril@fsskj.upsi.edu.my

ABSTRACT
Numerous researches has been conducted to investigate the effects of Teaching Games for Understanding (TGfU), Non-linear pedagogy (NP) and Linear pedagogy (LP) in tactical decision making and skill execution performance of game play. Whilst the effect of learning process in terms of lesson contents which directly influence the game play often neglected. Therefore the purpose of this time-series quasi experimental design was to investigate learning process in terms of lesson contents of warm-up related activities, class general management, technical practice of game play, SSG activities and full game activities. The study employed intact class students (aged 13 year old) across in Malaysia. A total of n=30 students were observed by video recording of each NP, TGfU and NP at three lessons interventions. The study adopted SOTG-PE Observational Analysis instrument quantitatively assessed the lesson contents. The data were analysed in terms of descriptive and inferential statistics (mean, SD, ANOVA Repeated Measures). Findings indicated all the components in game learning process except general class management and full game, findings indicated NP, TGfU supremacy over LP. The present findings encourages teacher adopted NP, TGfU to enhance learning and game play performance.

Keywords: Pedagogical models, NP, TGfU, LP, Learning process, Lesson content

INTRODUCTION
Studies that investigate the effects of pedagogical models towards game play in Physical Education (PE) environment usually evaluated through the game play output performance such as in tactical decision making and skill executions components. Whilst the effect of learning process in terms of lesson contents of warm-up related activities, class general management, technical practice of game play, small-sided game play (SSG) activities and full game activities which directly and directly influence the game play output performance often been neglected. Reasonable number of research globally and in Malaysia were done to confirm the efficacy various pedagogical model such as Teaching Games for Understanding (TGfU), Non Linear Pedagogy (NP) and the traditional Linear Pedagogy (Direct Instruction) in terms of game play tactical decision making, skill execution performance and physical adaptation (Balakrishnan, Rengasamy, & Aman, 2011; Karim, Abd Ghani, Submit Date: 05.07. 2018, Acceptance Date: 22.08.2018, DOI NO: 10.7456/1080SSE/233
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& Nadzalan, 2018; Md Noor, Karim, Hazley, & Nadzalan, 2017; Nathan & Haynes, 2013; Nathan, Shariff, & Salimin). Precisely research pertaining tactical decision making of choosing right skill execution, opening and closing space, skill execution executing technically such as dribble, passing, ball control components (Nathan, 2016; Nathan, Salimin, & Shahril, 2017). Drawing back from the above assumptions various modes of pedagogical models has been tested for the efficacy of learning output but on the other side of continuum the learning process of student’s interactions with lesson context which often undermined.

Educational and psychological theoretical underpinning retreat that indirect learning approach characteristics with warmth types of questions, praise, flexibility in learning process compared to more direct teaching and learning approach plus structured and controlled by teachers known as the Linear pedagogy (LP), (Rink, 1993, 2001). As the direct instruction or the Linear pedagogy boils around task-orientated, structured skill teaching activities, skill drills, feed backs compared indirect game based learning models (GBAs) such as Tactical Game Model (TGM), TGfU, Play Practice; Game Sense seems to be much sought pedagogical model global game learning and teaching via modified game play (Hopper, 2002; Rink, French, & Tjeerdsma, 1996).

Lately NP was highlighted as new way to understand learning process in games and sports which is based on manipulating relevant determining factors such as task, environment and individual or performer (Araujo, Davids, & Hristovski, 2006; Gil, Araújo, García-González, Moreno, & del Villar, 2014). As pointed out by Rink the direct approach or deductive approach boils down from behaviour learning theory, TGfU dwelled from information and constructivism learning theories (Rink, 1993). While the NP supported by Constraint-led theory, Complex learning theory as well as Dynamical system theory which supports the ecological approach able to help teacher, coach and researcher to understand learning in game and sports. Dynamical system theory is an interdisciplinary framework utilized to study coordination process in physical, biological, and social system that influence game learning process and performance (Grehaigne, Bouthier, & David, 1997). Drawing back to this global scenario and supported by local research findings prompted the Education Ministry of Malaysia to introduce TGfU as the main pedagogical approach be employed in primary and secondary schools Physical Education (PE) game curriculum (Kementerian Pendidikan Malaysia, 2016a, 2016b). Based on these earlier research, the Malaysian Education Ministry inducted the original TGfU model conceptualized by the British educators David Bunker and Rod Thorpe (Bunker & Thorpe, 1982; Metzler, 2017), as one of the pedagogical enquiry based approach in the standard based KSSR, KSSM PE game curriculum for primary school and secondary schools (Kementerian Pendidikan Malaysia, 2016b).

The underlying philosophy of TGfU underpins constructivism and cognitive theory, whereby the model is a student centered game based approach emphases on tactical elements of decision making and followed skill/technical development within small sided game play (Nathan, 2016). In contrast with the traditionally sports and teaching models focused prioritize technical skills akin to LP (Práxedes, Del Villar, Pizarro, & Moreno, 2018). On the other hand motor learning exponents as to defend the value of student-centred technical-skill development approach, they proposed the Nonlinear pedagogy (NP) which underpins Constraints-Led Theory (CLT) as their main pedagogical framework for PE instructions in sport-related game learning and teaching (Araujo et al., 2006; Chow, 2013; Chow et al., 2007). The NP pedagogy for game learning underpins CLT and in terms of philosophy, it’s a student’s centred technical approach. As to confirm the efficacy NP as suitable game play approach, a number of researches has been conducted by motor learning experts to support their claim (Araujo et al., 2006; Chow, 2013; Chow et al., 2007). Furthermore, the magnitude of CLT from ecological theory of motor learning seems to attract significant attentions among researchers, educationist and physical education theory generator (Chow, 2013; Nathan et al., 2017).

However, despite the emergence of TGfU and NP that underpins CLT, the Linear Pedagogy model (LP) a teachers’ centered approach or skill-led or technical-based model of teaching games do have it’s value. The LP model advocates three stage of linear process of teaching viz warming up activities, skill/technical activity/skill drills and a game-based activity and the end. As it’s this LP model still fancied by certain sector of society in the education and coaching context especially for skill development (Nathan et al., 2017; Rink, 1993). Some findings indicated LP able to develop and
upgrade skill technical game play configuration (Nathan, 2008; Turner, 1996; Turner & Martinek, 1999).

However, the LP model considered too structured, with warming-up activities and skill drills being the main components and thus depriving students of substantive opportunities to participate in game play. Technique is physical movement and it only becomes skills if it is done in context. The emphasis of this model is on acquiring technical skills for game play, while cognitive skills which are essential for effective participation are often ignored consequently, it is suggested that students fail to transfer the skills and knowledge, tactical decision-making elements of game performance to game plays (Turner, 1996; Turner & Martinek, 1999). On the other hand using Non-Linear pedagogy (NP) such TGfU model shows that this model has been effective in teaching hockey and basketball especially in attributes like ball control (Light & Fawns, 2003; Nevett, Rovegno, Babiarz, & McCaughtry, 2000).

Kudos to Malaysian and global educationist and researchers able to conduct many research comparing TGfU with conventional skill-based pedagogical model in education and coaching context, evaluating in terms of outcome or product of learning (Memmert et al., 2015; Nathan, 2016; Nathan et al., 2017). However limited research has been conducted to investigate the merged model of TGfU with Non-linear pedagogy (NP) as holistic game-based NP or TGfU or LP pedagogical models for game learning process. By investigating the pedagogical models such as NP, TGfU and LP, perhaps it will give some insight to the Ministry of Education, how far Malaysian students are ready for face student centred game learning such as NP, TGfU (KSSM) approach. Furthermore, to know how far LP still relevant among students in the teachers-cantered teaching-learning process, as LP face challenges with fast moving technological and 21st century education system learning environment Expected outcome NP holistic pedagogical model, TGfU model supposed to be better pedagogical approaches compared to linear pedagogy in game learning. Whatever it’s, situational learning may play a catalyst in moderating these pedagogical models implementation students game learning and teaching.

In reference to curriculum document of DSKP on the recent PE standard based game curriculum in Malaysia, the curriculum section advocate original TGfU model as the main pedagogical approach on learning games such as badminton. However based on KSSM textbook, and Buku Panduan Permainan anecdotal evidence and observation of the implementation game instruction such as badminton in schools (Malaysia, 2016a, 2016b). Badminton become our interest of study as badminton is one of the major sports in Malaysia and has given many medals to Malaysia in the Olympic Games. Thus, studying the methods that are effective in teaching badminton would be very valuable for the sport development in this country. Through the increase of focus towards badminton in Malaysia, studies conducted in badminton also increased ranging from many fields such as biomechanics (Nadzalan, Azmi, et al., 2018; Nadzalan, Mohamad, Lee, Tan, et al., 2017; Nadzalan, Mohamad, Low, & Chinnasee, 2018; Nadzalan, Mohamad, Low, et al., 2017), physiology (Ooi et al., 2009), strength and conditioning (Nadzalan, Mohamad, Lee, & Chinnasee, 2017; Nadzalan, Mohamad, Low, Malik, et al., 2018), performance analysis (Abdullah et al., 2018; Nadzalan, Abdullah, et al., 2018), injury analysis (AA, 2009; Goh, Mokhtar, & Mohamad Ali, 2013) and many more.

Preliminary findings through these sources highlighted the implementation of game play in schools at large seems to be technical-skill driven, student centred game approach as proposed by (Chow et al., 2007) and a mixture with structural lesson or the skill-based a linear model. The draw back in the implementation of TGfU, as TGfU model proposed tactical components learning to be taught earlier before technical-skill development, otherwise the game will collapse (Hopper, 2002). The pedagogical problem lies how far tactical and then technical-skill developments elements being taught in the TGfU pedagogical implementation in Malaysian schools. Even though TGfU seems to be popular among educationist, however it still has its weakness especially to address weaker ability students, therefore it’s suggested on Linear pedagogy (NP) which underpins CLT could be another pedagogical model in teaching and learning game such badminton (NATHAN et al.; Rink et al., 1996; Robinson & Foran, 2011). Owing to this problem this preliminary research has been conducted in the Malaysian school using Non Linear pedagogy a student centred tested in term of badminton game play outcome performance. To support the holistic Non Linear pedagogy as a another solid game based pedagogical approach, it need further study in terms of game based learning process (Nathan et al., 2017).
Students learning, teachers teaching and teachers as facilitator much depends on learning process in terms of lesson content. As Roberts and Fairslough through his SOTG-PE Observational Analysis, quality of learning process on lesson content consists of warm-up related activities, general management, technical practice, small-sided game play (SSG), full game play (Roberts & Fairclough, 2012). Therefore, it’s crucial to investigate the learning process in terms lesson context which consists of warm-up related activities, general management, technical practice, small-sided game play (SSG), full game play to confirm effective pedagogical models to support learning process. The main objectives of the present study was to investigate the effectiveness of NP compared to TGfU and LP in the learning and teaching process behaviours of form one students during PE badminton instructions in terms lesson content of warm-up related activities, general management, technical practice, small-sided game play with tactical approach and full game play activities. The following statements exhibit the specific research questions employed this study, would there be any significant difference in learning-teaching process between NP compared to TGfU and LP pedagogical models in terms of warm-up related activities, general management, technical practice, SSG with tactical approach, full game play behaviour in badminton game instruction for form one students.

**METHODOLOGY**

This study employ quasi experimental time series design The quasi experimental time series design involves three groups of pedagogical models interventions of NP, TGfU as control group and LP as the independent variables, and each lesson intervention was videoed and analysed at three different time series, herewith labelled as post-test 1, video recording was analysed after lesson 1, post-test 2 video recording was analysed after lesson 2 and post-test 3 after lesson 3 respectively for NP, TGfU and LP. Whereas the measurement for learning-teaching process or the dependents variables comprises of lesson content activities engaging to warm-up related activities, general management, technical practice, SSG and full game play (Roberts & Fairclough, 2012).

**Participants**

Three states in Malaysia with three schools and three intact classes of form one male and female students (aged 13 years old) in year 2018 were chosen via purposive and intact sampling technique. Namely, one school and one class with intact sampling each in three states of Selangor, Perak and Penang in Malaysia were utilised NP, TGfU and LP models interventions. In each intact class three different lessons respectively for NP, TGfU and LP models were conducted at different point of time: post-test 1 were conducted during first lesson intervention, post-test 2 during second lesson intervention and finally post-test three during third lesson intervention. At each lesson 10 students from each model were observed through video recording respectively for NP, TGfU and LP. Hence during three point of times (three post-test) a total of n=30 students were observed by video recording of each pedagogical models interventions of NP, TGfU and LP.

Three experience teachers in three states were employed to teach three different pedagogical models for three weeks. The practical badminton teaching and learning lessons of NP, TGfU (KSSM) and LP lesson with the duration of a hour for each lesson were recorded during intervention and was analysed after intervention through video recording labelled as post-test 1,2 and 3. Therefore, a total number of three badminton lessons (duration each lesson 1 hour) each for NP, TGfU (KSSM) and LP were utilised and recorded during three points of time (post-test 1, 2 and 3) for learning process analysis. Each lessons was analysed qualitatively in terms lesson content activities engaging to warm-up related activities, general management, technical practice, SSG and full game play.

**Instrumentation**

The learning and teaching implementation of three pedagogical models of NP, TGfU (KSSM) and LP in this research was evaluated quantitatively adapt SOTG-PE Observational Analysis of student lesson contexts activities engaging to warm-up related activities, general management, technical practice, small-sided game play (SSG), full game play during badminton double game play as reflected in Table 1 (Roberts & Fairclough, 2012). To investigate PE badminton instruction process in terms of lesson content in badminton game play. A rubric scale of 5.4.3.2.1 will be coded for most appropriate behaviours to less appropriate behaviours. The rubric scale of one (1) considered low level of learning-teaching process, whereas two and three (2-3) considered medium level and four and five (4-5) indicated high learning and teaching process.
Data collection
Data were collected at three post-test (1st week, 2nd and 3rd week) immediately after intervention using video recording lessons of NP, TGfU (KSSM) and LP. At three post-tests all the sample groups of NP, TGfU (KSSM) and LP, the assigned teachers will teach a badminton lesson for an hour to the respective group before being evaluated in the respective groups at three different post-tests. This means the three recorded taught lessons respectively (NP, TGfU and LP) were evaluated at post-test one, followed another three lessons respectively at post-test two finally again another three lessons respectively at post-test that were administered. The learning process of each pedagogical models were evaluated based on lesson contexts of warm-up related activities, general management, technical practice, SSG, full game play. Quantitative data elicited from learning-teaching badminton process through nine video recording observations three each for NP, TGfU (KSSM) and LP during three post-test phase. Three selected and trained teachers coded quantitatively the badminton lessons after interventions post-tests using video clips in terms of lesson content warm-up related activities, general management, technical practice, SSG, full game play each NP, TGfU (KSSM) and LP pedagogical models.

Data analyses
The normalities test served as important procedure for researchers to execute inferenceential statistic test such Anova and Multivariate. The present research tested the normalities utilised Skewness and Kurtosis to determine normalities for dependent variables of warm-up related activities, general management, technical practice, SSG, full game play. Quantitative data elicited from learning-teaching badminton process through nine video recording observations three each for NP, TGfU (KSSM) and LP during three post-test phase. The data were analysed in terms of descriptive and inferential statistics (mean, SD, ANOVA Repeated Measures) for the quantitative method via SPSS software version 21 based on research hypothesis. ANOVA Repeated Measures was employed to investigate changes in mean score over three points of time.

RESULTS
As for warm-up related activities behaviour there was significant difference between NP compared to TGfU (KSSM) and LP in terms of in badminton game instruction for form one students at three different time points of lessons with ANOVA RM between subject indicated $F(2,27)=66.636$, $p=0.01$, $p<0.05$. Therefore the null hypotheses was rejected, as there was significant difference in learning-teaching process between NP compared to TGfU (KSSM) and LP in term of warm-up related activities behaviour in badminton game instruction for form one students. Meanwhile as for mean score indicated TGfU performed better followed by LP compared NP in warm-up related activities behaviour students engaging in badminton game learning. While Table 2. decepts Mean, SD for

Table 1: Proportion of lesson time in student activity type SOTG-PE variables

<table>
<thead>
<tr>
<th>Lesson context</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>Warm-up</td>
<td></td>
<td></td>
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<tr>
<td>General management</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Technical practice</td>
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<tr>
<td>Applied skill practice</td>
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<tr>
<td>Modified game</td>
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<tr>
<td>Small-sided game (SSG)</td>
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<tr>
<td>Full-game</td>
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</tbody>
</table>

Scale of 5,4,3,2,1 will be coded for most appropriate behaviours to less appropriate behaviours.
warm-up related activities behaviour for lessons at different time points for LP, NP and TGfU lessons interventions.

Table 2: Mean, SD for warm up behaviour for LP, NP, TGfU at three post-tests

<table>
<thead>
<tr>
<th></th>
<th>Post-test 1</th>
<th>Post-test 2</th>
<th>Post-test 3</th>
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<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>LP</td>
<td>3.900</td>
<td>.5676</td>
<td>10</td>
</tr>
<tr>
<td>NP</td>
<td>1.400</td>
<td>.6992</td>
<td>10</td>
</tr>
<tr>
<td>TGfU</td>
<td>3.900</td>
<td>.7378</td>
<td>10</td>
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</tbody>
</table>

Pair wise comparison for mean score based on adjusted Bonferroni among these three model across three different time points of lessons for warm-up related activities behaviour during badminton, there was significant difference between LP with NP, \( p = .001 \), no significant difference existed between LP with TGfU, \( p = .422 \), and there was significant difference between NP with TGfU, \( p = .001 \).

The result for general management behaviour there was no significant difference between NP compared to TGfU (KSSM) and LP in terms of in badminton game instruction for form one students at three different time points of lessons with ANOVA RM between subject indicated \( F(2,27)=66.636, p = .104, p > 0.05 \). Therefore the null hypotheses was accepted, as there was no significant difference in learning-teaching process between NP compared to TGfU (KSSM) and LP in term of general management behaviour in badminton game instruction for form one students. Meanwhile as for mean score indicated TGfU performed better followed by NP compared LP in general management behaviour students engaging in badminton game learning. While Table 3 deceptions Mean, SD for general management behaviour for lessons at different time points for LP, NP and TGfU lessons interventions.

Table 3: Mean, SD for general management behaviour for LP, NP, TGfU at three post-tests

<table>
<thead>
<tr>
<th></th>
<th>Post-test 1</th>
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<th>Post-test 3</th>
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<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>LP</td>
<td>3.200</td>
<td>.4216</td>
<td>10</td>
</tr>
<tr>
<td>NP</td>
<td>2.100</td>
<td>.5676</td>
<td>10</td>
</tr>
<tr>
<td>TGfU</td>
<td>2.600</td>
<td>.8432</td>
<td>10</td>
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</tbody>
</table>

Pair wise comparison for mean score based on adjusted Bonferroni among these three model across three different time points of lessons for general management behaviour during badminton, there was no significant difference between LP with NP, \( p = .315 \), no significant difference also existed between LP with TGfU, \( p = 1.00 \), and there was no significant difference between NP with TGfU, \( p = .136 \).

Findings for technical practice behaviour there was significant difference between NP compared to TGfU (KSSM) and LP in terms of in badminton game instruction for form one students at three different time points of lessons with ANOVA Repeated Measure between subject indicated...
Therefore the null hypothesis was rejected, as there was significant difference in learning-teaching process between NP compared to TGfU (KSSM) and LP in term of technical practice behaviour in badminton game instruction for form one students. Meanwhile as for mean score indicated NP performed better followed by LP compared TGfU in technical practice behaviour students engaging in badminton game learning. While Table 4 depects Mean, SD for technical practice behaviour for lessons at different time points for LP, NP and TGfU lessons interventions.

Table 4: Mean, SD for technical practice behaviour for LP, NP, TGfU at three post-tests

<table>
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<th>Post-test 1</th>
<th>Post-test 2</th>
<th>Post-test 3</th>
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<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>LP</td>
<td>3.900</td>
<td>.7378</td>
<td>10</td>
</tr>
<tr>
<td>NP</td>
<td>3.800</td>
<td>.9189</td>
<td>10</td>
</tr>
<tr>
<td>TGfU</td>
<td>2.700</td>
<td>.4830</td>
<td>10</td>
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</table>

Pair comparison for mean score based on adjusted Bonferroni among these three model across three different time points of lessons for technical practice behaviour during badminton, there was significant difference between LP with NP, \( p=0.01 \), significant difference also existed between LP with TGfU, \( p=0.01 \), and there was also significant difference between NP with TGfU, \( p=0.001 \). Findings for small sided game play behaviour indicated there was significant difference between NP compared to TGfU (KSSM) and LP in badminton game instruction for form one students at three different time points of lessons with ANOVA Repeated Measure between subject indicated \( F(2,27)=86.7412, p=0.01, p<0.05 \). Therefore the null hypotheses was rejected, as there was significant difference in learning-teaching process between NP compared to TGfU (KSSM) and LP in term of small sided game play behaviour in badminton game instruction for form one students. Meanwhile as for mean score indicated NP performed consistently followed by TGfU compared LP in small side game play (SSG) behaviour students engaging in badminton game learning. While Table 5 decepts Mean, SD for small sided game play behaviour for lessons at different time points for LP, NP and TGfU lessons interventions.

Table 5: Mean, SD for SSG behaviour for LP, NP, TGfU at three post-tests

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<th>Post-test 1</th>
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<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>LP</td>
<td>1.700</td>
<td>.483</td>
<td>10</td>
</tr>
<tr>
<td>NP</td>
<td>2.400</td>
<td>.516</td>
<td>10</td>
</tr>
<tr>
<td>TGfU</td>
<td>2.800</td>
<td>.632</td>
<td>10</td>
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Pair wise comparison for mean score based on adjusted Bonferroni among these three model across three different time points of lessons for small sided game play behaviour during badminton, there was significant difference between LP with NP, \( p=0.001 \), significant difference also existed between LP with TGfU, \( p=0.01 \), and there was also significant difference between NP with TGfU, \( p=0.001 \). Finally for full game play behaviour indicated there was significant difference between NP compared to TGfU (KSSM) and LP in badminton game instruction for form one students at three different times.
points of lessons with ANOVA Repeated Measure between subject indicated $F(2,27)=4174.84$, $p=0.01$, $p<0.05$. Therefore the null hypotheses was rejected, as there was significant difference in learning-teaching process between NP compared to TGfU (KSSM) and LP in term of full game play behaviour in badminton game instruction for form one students. Meanwhile as for mean score indicated LP allocated full game play followed by NP compared TGfU in full game play behaviour students enganging in badminton game learning. While Table 6 decepts Mean, SD for full game play behaviour for lessons at different time points for LP, NP and TGfU lessons interventions. Therefore seems to be TGfU advocated less full sided game play compared to LP and NP.

Table 6: Mean, SD for full game behaviour for LP, NP, TGfU at three post-tests

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<th>Post-test 1</th>
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<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>LP</td>
<td>4.800</td>
<td>.4216</td>
<td>10</td>
<td>4.200</td>
<td>.9189</td>
<td>10</td>
</tr>
<tr>
<td>NP</td>
<td>5.000</td>
<td>.0000</td>
<td>10</td>
<td>1.000</td>
<td>.0000</td>
<td>10</td>
</tr>
<tr>
<td>TGfU</td>
<td>1.700</td>
<td>.6749</td>
<td>10</td>
<td>4.700</td>
<td>.4830</td>
<td>10</td>
</tr>
</tbody>
</table>

The pair wise comparison among these three model across using bonferoni adjusted mean score at three different time points of lessons for full game play behaviour during badminton, indicated there was significant difference between LP with NP, $p=.001$, significant difference also existed between LP with TGfU, $p=0.01$, and there was also significant difference between NP with TGfU, $p=.001$.

DISCUSSIONS AND CONCLUSIONS

Generally one must understand a key future of any teacher’s role is to decide on the most appropriate learning and teaching approaches that can develop their students’ game learning process and enhance game play outcome components. The key findings of badminton game play learning and teaching lesson content process during three times of intervention were discussed in this section.

In the warming up based activity, TGfU model seems significantly appropriate instruction model as it recorded higher mean for warm activity compared to NP. The improvement in class room warming up activities by TGfU approach, as small sided game play proposed by TGfU model able to activate the student's aerobic, anaerobic capacity, stretches, mobility and improved skill related activities. The present findings supports the findings of O’Leary examined an experienced teacher employing TGfU model in UK secondary school to elicited occupational socialisation or the learning attitudes and behaviours. Data were collected from interviews, lesson observations and documentary evidence indicated supremacy TGfU over traditional or the linear approach, the traditional approach which taught from childhood were washed out with the introduction of TGfU in terms of students learning attitudes and behaviours (O’Leary, 2016).

On the other hand as for general management components indicated no significant difference prevailed among these three models, perhaps these models ingredients benefited teachers to manage and control the class in terms of change of activities, register being taken, and setting up equipment for general management components indicated no significant difference these three models. Another reason could skill levels do play an important part in game play performance, compared to instruction models effect evidenced by the Jianyu and Wenhao findings. The results of their findings indicated that, while progress was observed in students' performance in badminton, when the skill level became higher, students used a large portion of low quality serves and strokes across all the skill levels, and in addition, the rates of using standard serves and strokes, forceful strokes, and return to home base were also low (Wang & Liu, 2012).
As for the technical practice in the lesson process, NP showed supremacy compared to TGfU and LP, again the supremacy boils down the interwoven ingredients imbed in the NP. As for NP showed supremacy compared TGfU and LP as the class were involved in an activity s enhance technique elements of game play too. The present finding in line with Nathan, Salimin & Sharil indicated supremacy NP compared to Linear pedagogy (LP) in terms of tactical decision making when to apply of long and short shot, recovery to base, drop shot and smash in badminton doubles game play performance (Nathan et al., 2017). As the NP class involves in practicing techniques in a de-contextualized environments active passing drills, active isolated shooting drills. These activities developed NP model based on Constraint Led Theory principle of of task, environment constraints and performer.

On the other hand for small sided (SSG) lesson activities, NP and TGfU again showed significant higher mean score on small sided game activities, hence improvement and motivated players able to make right decision in game play process compared LP (MacMahon, Baker, & Farrow, 2013). The present finding support findings of Praxedes, Villar, Pizarro & Moreno, through their teaching study based on NP via small side game play (SSG) on decision making and execution of passes among U12 soccer player found that the NP significantly improved their performance compared to control group (Práxedes et al., 2018). As Tan, Chow and Davids in their article paper articulated that A Nonlinear pedagogy approach (NP) has the potential providing researchers and physical educators with understanding of theoretical and practical work on TGfU. NP has the avenue to support TGfU pedagogical principle in terms of sampling, tactical complexity, representation and exaggeration (Tan, Chow, & Davids, 2012).

In another study in Hong Kong learning experiences and understanding employing TGfU was compared among three groups of teachers viz ten pre-service Physical Education (PE) teachers, nine experienced PE teachers, and three University supervisors of TGfU. A semi-structured interview data were collected from each participant. Findings indicated positive proactive, constructivist views of TGfU presented by supervisors and pre-service PE teachers. On the other hand the experience teachers had more consideration for student skill level and skill development akin to traditional linear approach compared with university supervisors and pre-service PE teachers (Lijuan Wang & Ha, 2009; L. Wang & Ha, 2013). The popularity of TGfU goaded with another study by Gill-Arias, Harvey, Carceles, Praxedes & Villar investigating the impact of a hybrid TGfU-Sport Education (SE) unit compared to to direct instruction or the linear pedagogy on student’s perceptions of various aspects of their motivation (autonomous motivation, basic psychological needs, enjoyment and intention to be physically active) engage in Physical Education (Gil et al., 2014). Therefore NP and TGfU both located in the other end of continuum of indirect instruction associated student centered learning methodologies, is more implicit, and involves larger chunks of content and more holistic. The indirect instruction finds its roots in more cognitive strategy, role of perception and social learning theories (Rink, 2001).

While as for full game activities LP revealed significant higher mean score in full game activities compared to NP and TGfU, as this in line theoretical and traditional approach. In contrast TGfU learning process seems to advocated less full sided game play compared to LP and NP, again the findings supports the TGfU pedagogical element support mini game play of 1vs1, 2vs2, 3vs 3 as an example.

Conclusion
This part discusses the study findings based on specific objectives that underline in this study in terms of lesson context consists of warm-up related activities, general management, technical practice, small-sided game play (SSG), full game play. These assessments were carried out students at three time series of lesson interventions at post-test one, post-test two and post-test three. The summary of findings indicated that all the components in game learning process except general class management and full game, findings indicated NP, TGfU supremacy over LP. The present findings support the previous finding learning out performance especially in tactical decision making, skill execution in various game play research that been undertaken using NP and TGfU as pedagogical and coaching
approach. It is suggested that future research should consider other from learning process in terms of motor response (student motor/locomotion on task, student motor/locomotion of task) and teacher interactions in terms of verbal technical interaction and verbal tactical interactions.

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