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ORIGINAL ARTICLE

The Effect of Native-Local Games Based on Constraint-led and Teaching Game for Understanding Approaches on the Implicit Learning of Girl Students

Mina Keshavarz [*1], Hasan Mohammadzade [2]

1. Corresponding Author: Ph.D. of Motor Behavior, Faculty of Sport Sciences, Urmia University, Urmia, Iran E. Mail: minaakeshavarzii@gmail.com
2. Professor, Department of Motor Behavior and Sport Management, Faculty of Sport Sciences, Urmia University, Urmia, Iran

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Abstract

Aim: The purpose of this article was to investigate the effect of constraint-led approach and teaching game for understanding approaches on students' implicit learning in the form of native-local games. For this purpose, a quasi-experimental method with pre-test-post-test design and purposive sampling method was used. The current research included students aged 10-11 years old, divided into three groups of CLA, TGFU and control. The participants were trained for two one-hour sessions per week for twelve weeks according to the educational approach. CogLab software was used to investigate implicit learning. The results of the mixed ANOVA showed a significant difference between the pre-test and the post-test in the CLA and TGFU groups. Furthermore, 95% and 94% of the changes in students' implicit learning were influenced by CLA and TGFU teaching method. However, no significant changes were observed in traditional education. Therefore, it can be stated that the use of non-linear approaches can improve students' implicit learning.
***Keywords**: Traditional games, Students, Non-linear approaches, Implicit learning.*

Introduction

The latest trends in education indicate changing educational approaches and teaching methods while trying to increase student participation and improve the learning process (Trajkovik et al., 2018). Criticisms of such traditional approaches to learning, which are still considered in some studies (Haibach-Beach et al., 2023), started in the 1980s with the emergence of the constraint-led approach (CLA) (Davids et al., 2005). The constraint-led approach originated from the work of Newell (1986) and has emerged as an educational option for teachers and coaches in sport and physical education, and at its simplest, this approach appears to be a direct model for teachers (Renshaw & Chow, 2019). According to the findings of Liu (2023), the constraint-led approach places learners at the center of the learning process and promotes their active participation and motivation. This approach takes advantage of intrinsic motivation and strengthens a sense of ownership and agency by providing autonomy, choice, and opportunities for self-directed learning to data learners.

In the late 1970s, in response to growing dissatisfaction with conventional approaches to learning, the teaching games for understanding (TGFU) approach emerged. The researchers in this model confirmed that if tactical considerations are emphasized in a game, children will find that games can be interesting and enjoyable" (Bunker & Thorpe, 1986). In their research, Ortiz et al. (2023) showed that TGfU can be a suitable educational approach to use in any situation to improve learning and skill performance.

Overall, based on the evidence presented above, despite significant efforts by Newell et al. (1986) to advance the understanding of movement learning among educators through a constraint-led approach, as well as Thorpe et al. However, very few applied studies have been conducted on the above approaches by motor learning researchers. Therefore, the lack of empirical evidence in the use of two non-linear, constraint-led approaches and teaching game for understanding in schools is one of the reasons for of conducting this research. This research measured learning in a dynamic state, i.e. during performing the game. Examining the studies conducted in non-linear approaches and compare them with linear approaches in terms of their effect, the current research sought to answer the question of whether native-local games based on non-linear educational approaches have a positive effect on students' implicit learning or not.

Methodology

The present applied research was of quasi-experimental type, with a pre-test and post-test design, which was conducted in the field. The statistical population of this research was all fifth-grade students of Tabriz city. Therefore, 42 students of 10-11 years were selected and randomly divided into three groups of CLA, TGFU and control. The current research included three stages of pre-intervention, intervention and post-intervention. In the pre-intervention stage, the participants were familiarized with the native-local game and research stages in one week. Furthermore, practice approaches were discussed separately, and tasks and goals were explained. Similarly, the researcher approached the sports teachers to discuss the purpose of the study. During a period of six lessons (three weeks), the native-local game was taught to the teachers using the CLA and TGFU model by the researcher. None of the teachers were experienced in using these approaches. Then, the dependent variable of the research was evaluated in the pre-test using the implicit learning test of CagLab software. Then, in the intervention phase, the independent variables of the research were examined with the protocols of native-local games based on the approach of non-linear education (CLA and TGFU) and linear education (control) for two one-hour sessions per week for twelve weeks separately in each group. Based on the type of the game, the necessary equipment was provided and the intervention was carried out in the desired space (school yard, classroom or a large covered space with flooring). The intervention was conducted during the second semester of the academic year 2021-2022, with the aim of exposing teachers to alternative approaches to teaching that challenge established beliefs and practices and change their role from teacher to facilitator (Harvey et al., 2010).

Results

Shapiro-Wilk test was used to check the normality of data distribution in pre-test scores. After confirming the normality of the data, one-way ANOVA was used to check the presence or absence of differences in the pre-test. In order to investigate the difference between pre-test and post-test in all three groups (CLA, TGFU and control group), 2x3x1 mixed ANOVA test was used for implicit learning variable.

According to the results of one-way ANOVA, there was no significant difference between the three groups in the pre-test in terms of implicit learning ($F_{(2,39)}$=3.02, P=0.06). Next, the results obtained from the mixed ANAVA showed that the main effect of time (pre-test and post-test) ($F_{(1,39)}$=905.14, P=0.0001), the main effect of group (CLA, TGFU and control group) ($F_{(2,39)}$=277.77, P=0.0001), and the interaction effect between group and time ($F_{(2,39)}$=227.91, P=0.0001) were significant.

Table 1. Pairwise comparison of groups in pre-test and post-test of implicit learning

Groups	Subjects	Group (i)	Group (j)	Mean difference	Standard error	Significance level
CLA	implicit learning	Pre-test	Post-test	248.85	9.57	*0.0001
TGFU	implicit learning	Pre-test	Post-test	250.37	9.57	*0.0001
Control	implicit learning	Pre-test	Post-test	-0.59	9.57	0.95

The results of the pairwise comparison of the groups using Bonferroni's *post hoc* test in the constraint-led approach are: ($F_{(1,39)}$=676.35, partialη^2=0.94, P=0.0001), in the teaching game for understanding approach these findings gave: ($F_{(1,39)}$=654.62, partialη^2=0.95, P=0.0001) and for the control group it includes the following results: ($F_{(1,39)}$=0.004, partialη^2=0.004, P=0.95). The results revealed that native-local games based on the constraint-led approach and teaching game for understanding improve students' implicit learning such that

probably 94% and 95% of the changes in students' implicit learning pertained to these approaches. While in the traditional group, only 0.04% change was observed in students' implicit learning. Therefore, it can be stated that the implementation of native-local games based on the TGFU has a greater effect on students' implicit learning than the traditional teaching approach.

Discussion and conclusion

The results of the present study showed that the students in the TGFU group showed a significant superiority in implicit learning compared to the CLA and traditional education (control) such that probably 95% of the changes in the students' implicit learning pertained to the non-linear approach of TGFU.

The results of the present study are consistent with the findings of bin Ibrahim and Siong (2021) who concluded in their research that native local games using non-linear TGFU approach are suitable for improving learning in children with learning disabilities such as dyslexia, autism, and late learning (Ibrahim et al., 2021).

However, our study had some limitations. Considering the dissatisfaction with the traditional education approach to learning in physical education environments, it is necessary to consider alternative educational approaches. According to the findings of the present research, non-linear approaches, which were investigated and compared with the conventional teaching method, proved to be superior. Therefore, we suggest that future studies continue to develop non-linear constraint-led approaches and teaching for game understanding with a focus on other sports disciplines.

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