

Academic and Social Engagement: The Effect of Flipped Classroom on Physical Fitness by Using Teaching Game for Understanding Strategy

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ABSTRACT

The research aimed to examine the utilization of flipped classrooms employing the Teaching Game of Understanding (TGfU) Strategy in Sports Teaching to enhance both the academic and social engagement of students in improving their physical fitness specifically in volleyball. This study utilized experimental-quantitative research approach with survey methods. The sample consisted of 40 eleventh-grade students from State Senior High School of 1 Pariaman. Data pertaining to students' academic and social engagement were collected through questionnaires utilizing a 5-point Likert scale, while physical fitness data were obtained using the Indonesian Physical Fitness Test. The data analysis employed multiple linear regression tests. The research findings indicated that the implementation of flipped classrooms with the TGfU strategy significantly influenced students' physical fitness by enhancing their socialization skills, personality traits, self-control, and academic engagement. Furthermore, academic engagement demonstrated a significant correlation with physical fitness across the PUC, TIR, EVN, and LMR groups. Sports educators can effectively employ the Teaching Game of Understanding model to enhance the physical fitness of volleyball learners.

Keywords: Flipped Classroom, Cognitive and Social Engagement, Physical Fitness, Teaching Game for Understanding



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INTRODUCTION

The Flipped Classroom learning model was developed to support athletes in their training endeavors both within and outside of the school environment. This model is utilized to encourage students to engage in physical exercises across various sports activities that have been taught. By implementing the Flipped Classroom model in conjunction with the Teaching Games for Understanding (TGfU) strategy, students are provided with ample time to practice not only during school hours but also during their leisure time, allowing them to incorporate physical activities into their daily routines (Bergmann & Sams, 2012). The implementation of the flipped classroom model, guided by a specially designed textbook on physical movement, aims to enhance athletes' physical fitness.

Based on (Scagnoli, 2012), the flipped classroom is described as a pedagogical model in which the learning process initiates by assigning tasks and exercises to students to be completed at home, prior to utilizing various instructional media. These media encompass manual

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resources, handouts, audiovisual materials, videos, and other printed media. It is expected that students actively engage in learning at home or in any location where they can carry out the assigned readings and exercises, as instructed by their teacher, before engaging in classroom discussions. Additionally, Bariham (2022) revealed that teachers may employ information technology, such as the internet, to deliver course content through online platforms such as Online Video, WhatsApp, YouTube, V-Class, Google Classroom, Smart Class, and other similar mediums.

Learning materials such as instructional books, handouts, audiovisual resources, printed media, WhatsApp, and Google Classroom serve as tools employed to facilitate students' access to course materials beyond the confines of the classroom. This approach primarily focuses on engaging students in tasks, exercises, and discussions (Moorhouse & Wong, 2022). In essence, the flipped classroom learning model diverges from the traditional model by encouraging students to learn the material outside of class and engage in problem-solving discussions during class time. Conversely, in the traditional classroom setting, students acquire knowledge during class and engage in discussions through assigned homework outside of class. The term "flipped classroom" has subsequently gained widespread acceptance, particularly with the utilization of digital recordings as instructional materials, allowing students to learn irrespective of their physical location (Gross et al., 2015).

The flipped classroom learning model is an instructional approach that facilitates learner-centered education. It enables students to independently review course content and grasp the material through group discussions, either online via platforms like WhatsApp or through face-to-face meetings outside of the classroom. These discussions are held prior to the scheduled classroom session, where the assigned topics are presented and further deliberated upon. This approach ensures that students gain a preliminary understanding of the subject matter before engaging in classroom discussions with their peers. The Flipped Classroom Model provides students with additional opportunities to interact with both their classmates and instructors during in-class learning discussions, fostering collaborative learning experiences. As a result, the classroom environment becomes more dynamic and engaging, with teachers actively participating in the learning process and allocating sufficient time to each student for sharing information pertaining to the previously studied material outside of the classroom (Reyna, 2015).

The implementation of the Flipped Classroom Model can be conducted by an educator who intends to explore the instructional design element. The efficacy of the Flipped Classroom Model with the TGfU strategy heavily relies on students' inclination to engage in learning activities outside the classroom and their preparedness to actively participate and discuss during class sessions (Howey & Hewett, 2015). This aspect may be deemed as the foremost factor to contemplate when adopting the Flipped Classroom Model.

In the realm of sports education, the active involvement of students holds greater significance. The proactive engagement of students in physical exercises necessitates the presence of an instructor who can assume a pivotal role in enhancing the level of active learning and comprehension of theoretical concepts, as well as the direct application of physical movements in sports activities (Larson, 2000). Consequently, the inquiry arises: how can a sports instructor effectively cultivate and foster the positive advancement of students' academic and social engagement to encourage their heightened participation in sports training, both within the confines of the classroom and beyond? One solution is to apply the flipped classroom method with the TGfU Strategy for sport education.

Sport serves as a means to impart life lessons to children. A practical approach to fostering active student engagement in various activities, enabling active learning in academic pursuits and active participation in social interactions. This methodology aims to establish a self-directed learning model, wherein students enhance their learning capabilities through group or individual

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training. Concurrently, students can develop their social cognition and improve the learning environment both inside and outside the classroom, without requiring constant supervision from their teachers (Siedentop et al., 2019; Reflianto & Makki, 2021).

The development of the physical education training program is a crucial aspect of the training itself. Among the top priorities for the new class of instructors is the creation of a flipped classroom model with the TGfU strategy, aimed at enhancing student learning beyond traditional classroom boundaries through the utilization of diverse instructional media, both online and offline. When constructing this model, it is essential to cultivate students' awareness and active involvement in the learning process and sports practice. Encouraging active participation among students can be achieved by boosting their engagement in each academic activity and fostering their interaction with peers in both classroom and extracurricular sports science settings (Østerlie, 2018). According to Zhu et al. (2020), the development of instructional design plays a crucial role in addressing various challenges encountered during each class session.

In the process of designing the exercise, it is necessary to enhance academic engagement and social interaction. Teachers should develop a training program comprising various media tools, such as videos, YouTube, and accessible MOOCs, to enable students to learn independently or in groups. In this study's design, exercises were designed to promote the development of both academic skills and social skills. Academic engagement is considered a variable in educational psychology. Students engage in academic activities within the school setting, and academic engagement is regarded as a learning model developed by behaviorist scholars, namely Skinner and Wellborn and subsequently expanded upon by Connell as academic engagement and achievement (Fan, 2023). According to this model, academic engagement is viewed as the outcome of a process in which the school provides a social environment that fosters students' feelings of competence, autonomy, and independent learning abilities (Wang, Degol, et al., 2019). Academic engagement is characterized by behavioral and emotional aspects that motivate individuals to take action. Behavioral engagement is assessed through indicators such as effort, intensity, absorption, as well as the emotional interests of students (Boekaerts, 2016).

The academic engagement of students is perceived as a fundamental aspect of their participation, which is conceptualized as the outcome of a combination of intention and the integration of academic and social success. This concept is based on the educational model employed in schools. Perkmann et al. (2021), which has proven to be a significant variable in research on student retention and protective factors against undesirable student behaviors aimed at enhancing their academic engagement (Kim et al., 2019). At the individual level, academic engagement encompasses students' involvement in their study-related activities, demonstrated through their effort, motivation, and interest in completing assigned tasks outside of the classroom. Consequently, academic engagement is typically evaluated through key indicators that assess students' consistency in learning and their willingness to undertake assigned learning tasks prior to class commencement (Konold et al., 2018).

The introduction of research on students' academic engagement was pioneered by Balwant (2018) in light of their findings regarding student engagement and fatigue in the academic environment. Zahoor (2018) view academic engagement as a state characterized by positive job-related conditions and mental satisfaction, manifested through vigor, dedication, and absorption. Pirrioni (2018) Vigor denotes an individual's energy investment in learning, while dedication pertains to their learning-driven orientation. Peñalver et al. (2019) presented a study that examined three dimensions of academic engagement proposed by Schaufeli, specifically their connection to students' academic and psychological adjustment. These dimensions encompass participatory behavior, enthusiasm, and dedication.

The research conducted by Skinner et al. (2016) focuses on measuring the level of satisfaction among students who participate in academic activities, which is considered as academic engagement. Schaufeli's study on peer involvement is a component of measuring academic engagement, examining students' behavior and academic achievements. The relationship between students' passion and their excessive involvement in academic activities can be understood through various factors, including active participation in learning, enthusiasm, dedication, and fatigue considerations, all of which influence students' engagement in the academic learning process.

In the flipped classroom learning model with the TGfU Strategy, academic engagement serves as an indicator that can be evaluated through the effectiveness of this model in fostering active and participatory learning among students in various academic activities, including their social involvement within learning groups. Social engagement refers to the maintenance of social relationships and students' participation in social activities (Zhang et al., 2018). Recent studies have indicated that parents who are socially involved tend to contribute to higher levels of cognitive functioning in students Reynolds and Chiu (2016) when compared to learning approaches that exclude parental involvement in students' social engagement. However, the extent to which social engagement can influence cognitive function remains an area that requires further investigation.

In the existing body of literature, there have been no specific studies investigating the potential correlation between academic engagement and social engagement in relation to learning outcomes. Similarly, there is a lack of research exploring the relationship between these variables and the improvement of students' physical fitness within the context of sports. Thus, this study aims to examine the association between academic engagement and social engagement and their impact on the physical fitness achievement of eleventh-grade students at State Senior High School 1 Pariaman.

METHODS

Research Design

This research employs an experimental quantitative methodology utilizing a survey design. As per Creswell's assertion, an experimental quantitative study aims to examine the hypothesized relationships among variables (Creswell W, 2014). The hypotheses in this study will be subject to empirical verification. The study posits a robust association between the variables, namely academic engagement, social engagement, and physical fitness achievement. Academic engagement is measured through the PUC, TIR, EVN, and LMR groups.

Research Samples

The sample consisted of 40 eleventh-grade students from State Senior High School of 1 Pariaman. They are divided into four groups of PUC, TIR, EVN, and LMR. PUC refers to students in the eleventh grade, aged between 15 and 17 years old. They originate from the Kampung Baru district, which is in close proximity to the school where they reside. Within the classroom setting, PUC is categorized as having exceptional academic performance. According to teachers' reports, PUC does not stand out in class and tends to display indifference. When visited by teachers, PUC becomes reserved and appears shy. In their daily lives, PUC is perceived as carefree students, but they do not exhibit diligence in their studies and show less enthusiasm towards their homework. PUC is considered enjoyable and cooperative by their peers; however, they dislike being reprimanded by friends. Teachers, on the other hand, tend to view PUC as less agreeable and receive less attention from them.

TIR is a class of eleven students aged 15 and 17 years old, originating from a village situated approximately 10 km away from the school. TIR exhibits average academic performance. In their

daily activities, the children of TIR tend to be reclusive and taciturn. TIR is not particularly enthusiastic about the assignments given by the teacher in the classroom, although they enjoy collaborating with their friends. TIR appreciates it when their classmates offer admonishment during class. From TIR's perspective, the teacher in the classroom should be more attentive, despite frequently exercising control and enforcing disciplinary measures. Regarding tasks, TIR is not lazy, although they often feel despair when assigned with assignments. As a result, TIR feels obligated when no homework is given.

EVN, a group of eleventh-grade students aged between 15 and 17, hails from the district of Padusunan. These students in the EVN class can be characterized as somewhat reserved and possess typical achievements. During lessons, EVN students prefer to collaborate with their peers. They eagerly engage in tasks that pique their interest, but display less enthusiasm when faced with less appealing assignments. EVN students are unperturbed by friendly admonishments while studying. According to EVN, the teacher in the classroom is an influential figure, but their teaching style often becomes monotonous, resulting in a lack of motivation to attend class. EVN doesn't feel obligated when given homework; however, they occasionally feel frustrated when teachers assign tasks that they struggle to comprehend and are unable to complete.

LMR is a student in the eleventh grade, aged 15-17 years, originating from villages located within a 5 km radius of the school. In terms of academic performance, LMR is included in the category of student achievement. During class, LMR tends to be reserved. However, despite being taciturn, LMR enjoys collaborating with classmates. LMR also appreciates having homework but tends to feel lazy when doing it alone. LMR dislikes individual tasks assigned in class, as they are often unpopular. LMR perceives the teacher as someone who lacks empathy for students due to an excessive workload and a reliance on rote learning, leading to students feeling embarrassed and punished. Moreover, during lessons, many students experience drowsiness.

Research Instruments

The research utilized a questionnaire to measure student engagement and social engagement. The Student Engagement in Schools Questionnaire (SESQ), developed by Hart et al. (2011), was employed to gather data on student engagement, using a Likert scale ranging from one to five (e.g., one representing "never" and five representing "always"). The responses from students were categorized into three groups based on the percentage of high, medium, and low engagement levels. The social engagement construct comprised three sub-variables: socialization ability, personal communication ability, and self-control in cooperation with others, as identified by Barak et al. (2016). In terms of academic achievement, data pertaining to students' physical fitness was collected through the Indonesian Physical Fitness Test (IPFT), which encompassed indicators such as the 40-meter sprint, standing long jump, 30-second sit-ups on a gymnastic bench with forward bending, pull-ups on a lower target bar, and a 600-meter run. The analysis of the physical fitness level of the children was classified based on their age, as outlined in the study conducted by Aminah et al. (2019).

Data Collection

The data collection in the field involved the utilization of questionnaires. The Likert scale with a 5-point system was employed to measure academic and social engagement data. The assessment of students' physical fitness achievement was conducted through the Indonesia physical fitness test. Prior to distribution to the research participants, all questionnaires were required to undergo a validation and reliability process. According to Creswell (2014), the validity of the test assesses the degree to which a measuring device accurately measures what

it intends to measure and demonstrates reliability. The measurement can be accomplished using the product moment, where an item is considered valid if it exceeds 0.30. Reliability, on the other hand, is established if all questions posed to respondents are deemed trustworthy based on the Cronbach alpha test. Inference analysis employed linear multiple regression to ascertain the relationship between academic and social engagement and students' physical fitness achievement.

RESULTS AND DISCUSSION

Result

1. Academic Engagement

The reporting of the implementation of the flipped classroom model with TGfU Strategy to enhance students' academic engagement can be presented in the following manner:

Table 1. Socialization Proficiency of Students within the Flipped Classroom Model Utilizing TGfU Strategy.

Elements of Socialization Ability	Category			Mean	Level
	Low (1.00-2.33)	Fair (2.34-3.66)	High (3.67-5.0)		
PUC	7 (17.5%)	24 (60.0%)	9 (22.5%)	3.61	Fair
TIR	9 (22.5%)	10 (25.0%)	21 (52.5%)	3.75	High
EVN	11 (27.5%)	12 (30.0%)	17 (42.5%)	3.67	High
LMR	12 (30.0%)	6 (15.0%)	22 (55.0%)	3.72	High
Average				3.69	High

Table 1 presented the results indicating that the academic engagement of eleventh-grade students is predominantly at a high level, with a score of 3.69. Further analysis of the sub-variables of academic ability reveals the following: in the first sub-variable (PUC group), the score was 3.61, with 9 individuals (22.5%) falling into the high category, 24 individuals (60.0%) falling into the fair category, and 7 individuals (17.5%) falling into the low category. In the second sub-variable (TIR group), the score was 3.75, with 21 individuals (52.5%) falling into the high category, 10 individuals (25.0%) falling into the fair category, and 9 individuals (22.5%) falling into the low category. The third sub-variable (EVN group) scored 3.67 in the high category, with 17 individuals (42.5%) falling into the high category, 12 individuals (30.0%) falling into the fair category, and 11 individuals (27.5%) falling into the low category. Finally, the LMR group scored 3.72 in the high category, with 22 individuals (55.0%) falling into the high category, 6 individuals (15.0%) falling into the fair category, and 12 individuals (30.0%) falling into the low category.

2. Social Engagement

Strengthening social engagement among eleventh-grade students can be achieved through the implementation of the flipped classroom model combined with the TGfU strategy. The analysis of social engagement can be elucidated by considering four sub-variables, namely cooperation, friendliness, tolerance, and adaptability. The following provides explanations for each of these sub-variables:

Table 2. Learners' Socialization Ability in Flipped Classroom Model with TGfU Strategy

Elements of Socialization Ability	Category			Mean	Level
	Low (1.00-2.33)	Fair (2.34-3.66)	High (3.67-5.0)		

Cooperative	2 (5.0%)	21 (52.5%)	17 (42.5%)	3.41	Fair
Friendly	4 (10.0%)	10 (25.0%)	26 (65.0%)	3.83	High
Tolerance	5 (12.5%)	7 (17.5%)	28 (70.0%)	3.95	High
Adaptive	8 (20.0%)	9 (22.5%)	23 (57.5%)	3.65	High
Average				3.7	High

Based on Table 2 presented above, it can be observed that the socialization ability elements of eleventh-grade students are predominantly categorized as high, with a score of 37.0. Further analysis of each sub-variable reveals the following: The cooperative skills, obtained a score of 3.41. Within this category, 17 individuals (42.5%) fell into the high category, 21 individuals (52.5%) fell into the fair category, and 2 individuals (5.0%) fell into the low category. The friendly attitude achieved a score of 3.83, indicating a high level. Among the respondents, 26 individuals (65.0%) were classified in the high category, 10 individuals (25.0%) in the fair category and 4 individuals (10.0%) in the low category. Tolerance behavior attained a score of 3.95 at a high level. We observed that 28 individuals (70.0%) belonged to the high category, 7 individuals (17.5%) to the fair category, and 5 individuals (12.5%) to the low category. Finally, the adaptive skills scored 3.65, also falling within the high level. Within this category, 23 individuals (57.5%) were classified as high, 9 individuals (22.5%) as fair, and 8 individuals (20.0%) as low. Regarding the variable of personal communication ability, we can find the detailed analysis results in the table below.

Table 3. Learners' Communication Ability in flipped Classroom Model with TGfU Strategy

Elements of Communication Ability	Level			Mean	Level
	Low (1.00-2.33)	Fair (2.34-3.66)	High (3.67-5.0)		
Communicative	5 (12.5%)	21 (52.5%)	14 (35,0)	3.21	Fair
Sharing Idea	3 (7.5%)	24 (60.0%)	13 (32.5%)	3.59	Fair
Give comments	27 (67.5%)	9 (22.5%)	4 (10.0%)	2.15	Law
Expression of opinion	6 (15.0%)	19 (47.5%)	15 (37.5%)	2.94	Fair
Average				2.97	Fair

Based on the analysis results, Table 3 indicates that the communication ability elements of eleventh-grade students are categorized as fair, with a score of 2.97. The first sub-variable, communicative skills, achieved a score of 3.21, falling within the high category for 14 individuals (35.0%), the fair category for 21 individuals (52.5%), and the low category for 5 individuals (12.5%). The second sub-variable, sharing ideas, attained a score of 3.59, indicating a fair level. It consisted of 13 individuals (32.5%) in the high category, 24 individuals (60.0%) in the fair category, and 3 individuals (7.5%) in the low category. The third sub-variable, giving comments, scored 2.15, placing it in the lower level. This sub-variable included 4 individuals (10.0%) in the high category, 9 individuals (22.5%) in the fair category, and 27 individuals (67.5%) in the low category. Lastly, the expression of opinion achieved a score of 2.94, falling within the fair level. It comprised 15 individuals (37.5%) in the high category, 19 individuals (47.5%) in the fair category, and 6 individuals (15.0%) in the low category. The self-control ability variable can be explained as follows, based on the analysis results:

Table 4. Learners' Self-control in Flipped Classroom Model with TGfU strategy

Elements of Self-Control	Level			Mean	LEVEL
	Low	Fair	High		

	(1.00-2.33)	(2.34-3.66)	(3.67-5.0)		
Satisfaction	7 (17.5%)	19 (47.5%)	14 (35.0)	2.46	Fair
Anxiety	21 (52.5%)	8 (20.0%)	11 (27.5%)	2.17	Low
Emotional stability	7 (17.5%)	24 (60.0%)	9 (22,5%)	3.61	Fair
Emotional Intelligence	6 (15.0%)	20 (50.0%)	14 (35.0%)	3.10	Fair
Average				2.84	Fair

Based on the data presented in Table 4, it can be observed that the Self-control elements category among eleventh-grade students is rated as fair, with a score of 2.84. The breakdown for each sub-variable is as follows: the enjoyable aspect falls within the fair category, scoring 2.46. This comprises 14 individuals or 35.0% in the high category, 19 individuals or 47.5% in the fair category, and 7 individuals or 17.5% in the low category. The anxiety sub-variable, it scores 2.17, indicating a low level. This includes 11 individuals or 27.5% in the high category, 8 individuals or 20.0% in the fair category, and 21 individuals or 52.5% in the low category. Regarding the third sub-variable, emotional stability, it is rated as 3.61, falling within the fair level. This consists of 9 individuals or 22.5% in the high category, 24 individuals or 60.0% in the fair category, and 7 individuals or 17.5% in the low category. Finally, the emotional intelligence ability is rated at 3.10, indicating a fair level. This includes 14 individuals or 35.0% in the high category, 20 individuals or 50.0% in the fair category, and 6 individuals or 15.0% in the low category.

3. Physical Fitness

The table below displays the final results of students' Physical Fitness Achievement after implementing the flipped classroom model with TGfU strategy, focusing on enhancing academic and social engagement in volleyball learning within the sport education subject. The students' Physical Fitness Achievement was assessed using the Indonesian Physical Fitness Test (IPFT).

Table 5: Student's Physical Fitness After following Sport Education by Using Flipped Classroom Model with TGfU Strategy

Elements of physical Fitness	Stage			Min	SD
	Low (1-2.9)	Enough (3-3.9)	Good (4.0-5.0)		
Running 40 Meters	3 (7.5%)	7 (17.5%)	30 (75.0%)	3.91	0.77
<i>pull up</i>	-	9 (22.5%)	31 (77.5%)	3.84	0.71
<i>Sit up</i> 30 seconds	-	4 (10.0%)	36 (90.0%)	4:25	0:57
Vertical jump	4 (10.0%)	22 (55.0%)	14 (35.0%)	3:22	0.87
Running 600 Meters	3 (7.5%)	24 (60.0%)	13 (32.5%)	3:47	0.89
Average				3.74	

Based on the data presented in Table 5, it is evident that the physical fitness level of eleventh-grade students in the 40-meter running component was 3.91, with a standard deviation of 0.77. This consisted of 3 individuals (7.5%) classified in the lower stage, 7 individuals (17.5%) in the sufficient stage, and 30 individuals (75.0%) in the good stage. The average score for the pull-up component was 3.84, with a standard deviation of 0.71. Out of the students, 9

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(22.5%) were classified as sufficient, while 31 (77.5%) were in the good stage. Similarly, the sit-up component had an average score of 4.25, with a standard deviation of 0.57. Among the participants, 5 individuals (10.0%) were classified as sufficient, while 36 individuals (90.0%) were in the good stage. The following component, the straight jump, had an average score of 3.22 and a standard deviation of 0.87. This study revealed that 4 individuals (10.0%) were in the lower stage, 22 individuals (55.0%) were classified as sufficient, and 14 individuals (35.0%) were in the good stage. Lastly, for the 600-meter running component, the average score obtained was 3.47, with a standard deviation of 0.89. Among the students, 3 individuals (7.5%) were in the lower stage, 24 individuals (60.0%) were classified as sufficient, and 13 individuals (32.5%) were in the good stage.

The indicators of Indonesia Physical Fitness Test (IPFT) of Indonesia which was held on the eleventh-grade students to overall items measured values obtained as follows:

Table 6. Students Physical Fitness After following Sport Education by Using Flipped Classroom Model with TGfU Strategy

No.	indicators IPFT	value Min	TCR	Stage
1	Running 40 Meters	3.91	81.2	Good
2	<i>pull up</i>	3.84	80.8	Good
3	<i>Sit up</i> 30 seconds	4:25	83.8	Good
4	Vertical jump	3:22	79.2	Good
5	Running 600 Meters	3:47	79.5	Good
Average Score		3.74	76.9	Good

Based on the data presented in Table 6, it is indicated that the mean score of students' physical fitness attainment in the flipped classroom model with TGfU strategy for eleventh-grade students was 3.74, with a Total Class Response (TCR) of 76.9%. This suggests that the physical fitness achievement of students in the flipped classroom, facilitated by an academic and social engagement model, reached a good level.

4. Influence of Academic and Social Engagement on Physical Fitness

The relationship between students' academic and social engagement and their physical fitness achievement can be elucidated through the utilization of multiple linear regression tests, as presented in Table 7 below.

Table 7. Partial Influence of Students' Academic and Social Engagement on Physical Fitness Achievement

		Coefficients				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-4.476	.851		-5.259	.000
	PUC	-.211	.247	-.129	-.854	.397
	TIR	-.181	.322	-.087	-.563	.576
	EVN	.077	.065	.222	1.181	.243
	LMR	-.212	.076	-.466	-2.787	.007
	Socialization	4.606	1.429	.376	3.224	.002
	Communication	.759	.276	.432	2.754	.008
	Self-Control	.175	.094	3.84	2.090	.042

a. Dependent Variable: Physical Fitness

The formulation of multiple linear regressions obtained from the table above is as follows: $Y = -4.476 - 0.211X_1 - 0.181X_2 + 0.077X_3 - 0.212X_4 + 4.606X_5 + 0.759X_6 + 0.175X_7$. Based on the significance level results, it can be concluded that among the seven sub-variables, only Academic Engagement significantly influences students' physical fitness in the LMR group. However, the PUC group, TIR group, and EVN group do not have a significant influence on students' physical fitness. In contrast, all sub-variables of Socialization Engagement have a significant influence on students' physical fitness. Partially, the two variables of academic and social engagement indicate that Academic Engagement negatively affects students' physical fitness, while social engagement positively influences students' physical fitness achievement when a flipped classroom mode is applied by the teacher for teaching volleyball in the sport education classroom.

Table 8. Simultaneously Influence of Students' Academic and Social Engagement on Students' Physical Fitness Achievement

		ANOVA ^b				
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	185.624	1	165.624	4.108	.048 ^a
	Residual	1935.096	37	40.314		
	Total	2100.720	38			

a. Predictors: (Constant), Academic Engagement, Social Engagement,

b. Dependent Variable: physical fitness

The strong relationship between students' social engagement and their physical fitness can be observed from Table 8 above when the teacher implemented the flipped classroom model with TGfU strategy. This approach simultaneously affects other aspects of physical fitness, as indicated by the F value of 4.108 and a significant level of 0.048 (< 0.05). Consequently, it can be concluded that both academic and social engagement significantly influence students' physical fitness achievement.

Discussion

These findings provide evidence for the strengthening effect of academic engagement on students' passion during digital classroom activities (Heidari et al., 2021). Furthermore, students' academic engagement demonstrates a distinct correlation with aspects of fatigue. When students experience fatigue, their academic engagement declines, resulting in a decrease in their learning condition. Unpleasant learning conditions also contribute to the reduction of students' academic engagement. Lower academic engagement naturally leads to diminished learning activities and exercises. Consequently, teachers and coaches play a crucial role in fostering students' motivation and passion by implementing a well-designed flipped classroom learning mode (Salmela-Aro, 2017; Reflianto, 2021). Through this model, students can actively engage in their sport-related learning activities anytime and anywhere. The spirit of students' participation in learning activities and exercises significantly influences academic engagement, making a substantial contribution to its various aspects (Giráldez et al., 2023).

In this study, the correlation between the academic engagement of senior high school students and their physical fitness achievements was found to be non-existent. This lack of correlation can be attributed to student fatigue resulting from the excessively long and intense study and practice assignments given by teachers, both within and outside the classroom. This excessive cognitive load directly leads to student fatigue, subsequently impacting their academic engagement negatively.

Based on Olakanmi (2017), the evaluation of teacher performance is based on their ability to cultivate students' passion through an engaging flipped classroom learning model. This model allows for additional study hours and exercises both inside and outside the classroom. However, excessive task load can lead to physical fatigue among students, which significantly diminishes their passion for future academic activities. Hence, when designing the learning model, teachers should consider cognitive load and address issues related to the assignment of physical exercises. Moreover, Carbonneau et al. (2008) argue that obsessive passion is positively correlated with fatigue resulting from excessive workload assigned by teachers (Lee & Cho, 2021). However, the findings of this study differ from those reported by Burić and Moe (2020), who claimed that teachers' role in enhancing students' passion is always positively correlated with students' enthusiasm, even when burdened with additional tasks. Conversely, Hawlitschek and Joeckel (2017) and (Vallerand et al. (2010) this study discovered a negative correlation, indicating that a heavy cognitive and physical exercise load makes students lose interest in the training, as emphasized by the cognitive load theory

Contrary to students who already possess an inherent interest in the sport being taught and the materials involved, they will exhibit greater enthusiasm and zeal towards learning and engaging in sporting activities at an elevated level. As the students' passion intensifies, their need for increased involvement in the learning process also rises. However, the findings of this study revealed contrasting results, as the students' passion for learning diminished due to excessive workloads assigned by teachers, combined with the cognitive burdens that hindered their capability and caused fatigue. Consequently, when implementing the flipped classroom model with the TGfU strategy, teachers must carefully consider various factors to ensure that students maintain their passion for learning and remain attentive to the materials being taught. The learning media employed should be easily accessible and facilitate repeated access, including both online videos and offline resources. The decline in students' passion makes them more susceptible to fatigue when required to perform and practice sports. These findings demonstrate that academic engagement does not significantly impact students' passion for enhancing their physical fitness.

The findings and analysis of the study revealed three sub-variables of social engagement, namely socialization ability, communication ability, and self-control. These sub-variables were

further divided into 12 themes for observation. This section presents and discusses the 12 themes identified as the study's findings. The twelve themes include cooperation, friendliness, tolerance, adaptability, communication, idea sharing, commenting, expressing opinions, enjoyment, anxiety, emotional stability, and emotional intelligence. Based on the analysis of the results, it was determined that eleventh-grade students exhibited a high level of socialization ability, as evidenced by a score of 37.0. This indicates that the students' socialization ability is considered sufficiently good.

The socialization ability of students in the four areas of cooperation, friendliness, tolerance, and adaptability, as well as communication, indicates that almost all students are willing to collaborate and demonstrate strong commitment to accomplishing group tasks. They are motivated to invest their time in studying together and make efforts to establish friendly relationships with their peers while working together to solve problems in the group class. They exhibit tolerance towards different ideas and adapt to one another within the study group through the implementation of the flipped classroom model with the TGfU strategy. It is worth noting that this model has a positive impact on improving students' socialization abilities. Furthermore, enhancing students' socialization abilities in sports and volleyball exercises leads to improved movement techniques and physical fitness achievements through group discussions and communication within the sports team.

The aim of students' social engagement is to enhance their social skills, making them more cooperative, friendly, adaptive, and respectful of others' opinions. This is beneficial for supporting the cooperative learning process within and outside the classroom, using the flipped classroom model with TGfU strategy. From a social construction perspective, social learning is facilitated through active interaction, involvement, and participation of students, with social learning interaction being a general term (Koivisto & Hamari, 2019). According to this viewpoint, learning is an ongoing transaction between students as individuals and their environment (Chang et al., 2019). This implies that the study is based on students' engagement, activity, and participation in their interactions with peers and teachers, considering the context and content. The role of social action in students' cognitive development is grounded in the premise of social construction, as proposed by Vygotsky (1978) in his theory of sociocultural development. The concept of the zone of proximal development is crucial for learning, referring to the gap between a student's current level of development and their potential to solve problems collectively, either under the guidance of a teacher or in collaboration with fellow students in study groups Vygotsky (1978). This mechanism ultimately influences students' self-regulation, as they learn to regulate their actions through interactions with more capable peers and internalize those actions. The development of socialization skills in students is of utmost importance in determining their success in the classroom, particularly for students learning sport education, as it helps improve their physical fitness and fosters the ability to discuss and argue while finding solutions to given cases.

According to Abeysekera and Dawson (2015) as well as O'Flaherty and Phillips (2015), the fundamental element of the flipped classroom is engaging students in social learning and active participation, typically through pre-class activities that involve collaboration within their peer groups. From this perspective, it can be inferred that the flipped classroom approach can be effective if students' social skills are effectively developed, leading to increased social engagement and active involvement in the teaching and learning process, both within and outside the classroom.

To cultivate students' social skills through the implementation of the flipped classroom model with TGfU strategy is to acquaint students with the process of learning the subject matter within collaborative groups comprising their peers. The formation of learning groups holds significant importance within the context of the flipped classroom. The outcomes

derived from the learning groups in the flipped classroom setting demonstrate that students' active participation within their study groups facilitates the teaching and learning process, fostering a heightened positive engagement in discussions, as well as interactive question and answer sessions, both online (via social media video platforms) and offline, during in-class sessions. This approach empowers each student to pose inquiries, engage in discourse, and collaborate with their peers within their respective groups. By leveraging the flipped classroom model, greater opportunities arise for the formation of study groups, given the ample time allotted for group discussions during classroom sessions.

The implementation of the flipped classroom model combined with the TGfU strategy, which allows students to interact actively with one another, has sparked numerous inquiries within the group. In instances where the exercises prove challenging, each member assists their peers in elucidating their comprehension of the theory and the problems being studied. Through the flipped classroom approach, teachers can create opportunities for students to assume additional roles in their learning process, such as contributing to group practice. Additionally, according to Murphy et al. (2015), fostering strong social engagement among students can yield a positive impact on their cooperative attitude development through social interaction with their peers during sports-related learning and practice.

Meanwhile, with regard to the variable of communication ability, there are four themes related to it: being communicative, sharing ideas, providing comments, and expressing opinions. It was observed that not all students possess a good communicative style and are willing to engage in sharing ideas and opinions regarding the presented problem (Zakaria, 2017). Some of them did not offer comments during group study sessions and lacked the ability to express their opinions while thinking aloud to find solutions to the given problem. However, it is worth noting that communication tools serve as effective media for sports education, enabling students to enhance their physical fitness achievements in group sports games. Students with strong communication abilities are more likely to actively participate in sports exercises during the study of sports education. Furthermore, this aspect adds value by encouraging students to diligently engage in physical activities with their peers, both inside and outside the classroom, across various sports activities.

Active engagement in communication plays a vital role in facilitating the teaching and learning process, particularly in sport education within the domain of volleyball, aimed at enhancing students' physical fitness. Through this approach, students can actively participate in volleyball playing and diligently engage in sports activities and discussions, whether in group settings or individually. The incorporation of the flipped classroom model, at the very least, allows for the effective development of students' communication skills as they exchange knowledge on proper volleyball exercises in a real sports environment, fostering interactive engagement through question-and-answer sessions. The ability of students to establish effective communication is regarded as a key factor in facilitating the sharing of sport education knowledge related to volleyball playing and physical fitness (Kahu, 2013b).

Many scholars posit that it is the responsibility of teachers to cultivate students' communication skills in the classroom, regardless of the intricate and multifaceted nature of this task (Fredricks et al., 2004). Active participation of students in classroom communication can foster diverse cognitive levels that ultimately impact their learning outcomes; in the domain of physical education, this can be observed through enhancements in students' physical fitness. Some researchers argue that student involvement is not only multifaceted but also dynamic, fluctuating depending on the context and the teacher's establishment of an interactive environment (Goldin et al., 2011). The close relationship between cognitive behavior engagement and affective behavior, as

elucidated by Fredricks et al. (2004), is widely acknowledged across three key dimensions. This is in line with the theory of social engagement proposed by Kahu (2013a)

Expanding the scope in this term involves considering the social engagement within a broader conceptual framework, taking into account various socio-cultural contexts that influence the impact of structural factors and psychosocial aspects on students' social engagement. Consequently, students' involvement in each social engagement, facilitated by the implementation of the flipped classroom learning model, yields positive academic outcomes and fosters social engagement for learner development, such as enhancing students' physical performance and cultivating self-motivation for lifelong learning. In brief, students' social involvement in terms of fostering communication skills among peers and with the teacher should be regarded as a psychosocial process, shaped by institutional and personality factors. Additionally, through the development of socio-cultural contexts, students are encouraged to actively participate in learning activities that have been collectively established through the implementation of the flipped classroom model with the TGfU strategy. This ensures the seamless integration of all elements into a cohesive learning process, enhancing students' learning behavior and psychological well-being. The findings of this study are supported by empirical data closely linked to the socio-cultural framework of student engagement in foreign language learning, such as the opportunity for speaking practice among students (Kahu, 2013a), as well as the core dimensions influencing students' cognitive and behavioral aspects discussed by Wang, Fredricks, et al. (2019), which were also acknowledged by (Kahu, 2013b). Cognition pertains to students' self-regulated learning, developed through social reinforcement, while the dimensions of students' social behavior encompass their investment of time and effort, interactivity, and active participation in learning sessions, both within and outside the classroom.

Finally, the students' self-control of emotions is comprised of four themes: satisfaction, anxiety, emotional stability, and emotional intelligence. These four aspects are crucial in supporting the enhancement of students' social skills in unfamiliar situations without losing their composure, as well as their emotional self-regulation through the establishment of cooperative learning environments in the classroom. Consequently, all students have equal opportunities to receive assistance from their peers within their study groups. Students who possess strong emotional stability during interactive communication are more likely to excel in question-and-answer sessions within the flipped classroom setting. Additionally, by displaying proficient volleyball skills in physical education classes, these students contribute to their overall physical fitness achievements.

A well-developed emotional self-control can influence students' readiness to learn, particularly in sports activities, as it helps reduce anxiety levels and facilitates active participation in discussions and interactive question-and-answer sessions. Affective factors, including satisfaction, self-control, and anxiety, are closely linked to the learning experience and play a crucial role in student engagement (Kahu, 2013b). The findings of this study reveal that some students demonstrate emotional satisfaction derived from their environment, which positively impacts their learning outcomes. Individuals with greater emotional stability exhibit lower levels of anxiety and consequently achieve higher levels of physical fitness. Conversely, individuals with lower emotional stability experience increased anxiety, leading to a reluctance to actively participate in volleyball sessions on the field. This situation clearly impedes students' learning progress and diminishes their enthusiasm for playing volleyball. The instability of emotions and students' anxieties significantly correlate with their performance in volleyball games.

Kahu (2013a), asserted that a strong correlation exists between students' emotional stability and teacher attitudes in teaching. Unpleasant classroom situations created by teachers can lead to stress among students, thereby affecting their learning performance. These

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situations include assigning complex tasks, showing no tolerance for mistakes, and penalizing students for incorrect answers. Clearly, such practices greatly influence students' self-control, satisfaction levels, anxiety, emotional stability, and emotional intelligence, consequently negatively impacting their learning performance. Kahu (2013b) emphasized the significance of students' self-control in creating optimal learning conditions within the classroom. To achieve this, the Flipped Classroom model can be employed, enabling increased student engagement and creativity during lessons, particularly in sports education practices such as volleyball. Murphy et al. (2015) emphasized the importance of dialogue between teachers and students as an effort to foster a positive and anxiety-free learning environment. When implementing the Flipped Classroom model with the TGfU strategy, teachers must strive to create a satisfactory learning environment for all students in the class. This approach is expected to enhance students' enthusiasm, encouraging them to be more active and creative in their volleyball game participation during sports education lessons. Consequently, it will reduce their anxiety levels and positively contribute to the strengthening of students' emotional stability and intelligence.

The establishment of effective social engagement among students through the implementation of the flipped classroom model combined with the TGfU strategy can be achieved by incorporating various online interactive media, alongside traditional face-to-face methods in the classroom. To enhance students' social engagement and foster active and interactive participation in class, recommended online interactive media include utilizing audiovisual resources for group-based learning, utilizing Google Classroom as an external learning space, and leveraging YouTube for supplementary materials to support collaborative learning beyond the classroom setting. Generally, students demonstrate increased enthusiasm for learning when utilizing video-based resources in conjunction with online interaction platforms such as Google Classroom or WhatsApp to complete assignments prior to interactive classroom sessions. The majority of students expressed high levels of satisfaction with the utilization of audiovisual and interactive online media like Google Classroom. By establishing this interactive approach, students' social engagement can be stimulated, and their self-control can be strengthened, which directly correlates with the improvement of their learning outcomes.

CONCLUSION

Based on the above-mentioned research findings and explanations, it can be inferred that students' socialization engagement was categorized as high, with a score of 3.7. Additionally, their communication ability and self-control ability were classified as fair, scoring 2.97 and 2.84, respectively. Moreover, students' academic engagement in both in-class and out-of-class sports practice was categorized as high, with a score of 3.69. Further clarification reveals that the PUC group scored 3.61, the TIR group scored 3.75, the EVN group scored 3.67, and the LMR group scored 3.72.

The relationship between academic and social engagement in students' physical fitness achievement was found to have a positive effect when considered simultaneously. However, when examined individually, the relationship between academic and social engagement on students' physical fitness achievement showed positive associations. Specifically, the academic and social engagement in studying and participating in sports practice stimulated students' persistence to enhance their physical fitness.

CONFLICT OF INTEREST

Hereby the authors declare that we have no conflicts of interest.

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