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The Effect of a Station-Based Chip Shot Learning Model Using a No. 9 Iron on Golf Learning Outcomes

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Abstrac: This study aimed to examine the effect of a station-based chip shot learning model using a No.
30 9 iron on students' golf learning outcomes. The study was redesigned as a quasi-experimental study
using a posttest-only control group design. The participants consisted of 36 students at Efro Golf
37 Academy Bandung. Data were collected using a chip shot performance test and analyzed through
descriptive statistics and an independent samples t-test at a significance level of 0.05. The results showed with independent samples t-test indicated a statistically significant difference between the two groups, t(34) = 15.84, p < .001, with a very large effect size. These findings indicate that the station-based chip shot learning model using a No. 9 iron was more effective than conventional instruction in improving students' chip shot skills in golf learning.

Keyword: Chip Shot, Station-Based Learning, Golf Learning, Quasi-Experimental Research.

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INTRODUCTION

Golf is a sport that requires not only physical strength but also coordinated motor control to optimize tempo, rhythm, balance, and movement efficiency during the swing (Kim & Han, 2018). Among the many skills necessary for effective play, short-distance shots are of critical importance, especially those executed around the green area. These shots, such as the chip shot, pitching shot, lob shot, and plop shot, require a high degree of skill, as they determine a golfer's ability to control the ball within a confined area. The chip shot, which is one of the most fundamental techniques in golf, is typically performed from the edge of the green, and it demands precision, body control, club control, and an appropriate sense of distance (Lawrie Montague & David Milne, 2014).

The skillful execution of chip shots is not solely dependent on a golfer's physical ability. It also hinges on the learner's capacity to adapt to varying conditions and to regulate their movement accordingly. Beak et al. (2013) argued that chip shots require a well-developed movement-control strategy to achieve optimal performance. Tanaka and Iwami (2018) similarly highlighted the importance of understanding the relationship between action and outcome in golf performance, as this understanding plays a crucial role in the execution of consistent and accurate shots. Therefore, effective golf learning not only involves physical training but also the cognitive understanding of the relationship between technical skills and performance outcomes.

From an anatomical perspective, several body parts play a pivotal role in the performance of a chip shot. The shoulder joint, in particular, is crucial for effective chip shot execution. The glenohumeral muscles and scapular stabilizers contribute significantly to upper-body control during the swing, influencing the trajectory, distance, and accuracy of the ball (Liem et al., 2014). This highlights the need for golfers to develop a deep understanding of their body's movements, which can be achieved through targeted, skillful practice that incorporates both physical and cognitive elements.

In golf learning, it is essential to expose students to varied learning environments in order to foster skill acquisition. Station-based learning, a method that allows learners to practice under diverse task conditions, has been shown to improve performance by offering repeated practice opportunities across different scenarios (Aiken & Genter, 2018). For chip shot learning, it is particularly important to simulate varied green-area contours because the golfer must be able to adjust their technique based on different slopes, such as flat, uphill, downhill, left-sloping, or right-sloping terrain. By providing exposure to these different conditions, golfers can better adapt their movements to meet the specific demands of the environment, ultimately improving their performance under real-game conditions.

The station-based learning model offers a structured approach that focuses on the development of specific skills through practice in varied contexts. For example, a station-based chip shot learning model could include stations that mimic flat green-area contours, uphill or downhill conditions, or left- and right-sloping terrains. By practicing in such diverse conditions, learners are able to experience a variety of challenges that reflect real-world situations they will face on the golf course. This exposure to different green-area conditions is critical for developing the flexibility and adaptability needed for effective chip shot performance.

Furthermore, the selection of instructional tools plays a significant role in skill development. The No. 9 iron, commonly used in chip shot instruction, is an excellent tool for building a stable sense of distance, ball contact, club control, and shot trajectory. Consistency in the equipment used allows students to focus their efforts on refining their swing mechanics and enhancing their understanding of how different techniques affect shot outcomes. By using the No. 9 iron throughout the learning process, students can concentrate on perfecting the fundamentals of the chip shot without the added complexity of adjusting to different clubs. This method is especially beneficial for beginner and intermediate learners who require a simplified approach to learning fundamental skills.

Several studies have explored the impact of varied instructional methods on golf learning outcomes. For instance, research by Steele et al. (2018) revealed that mastery of basic techniques, such as those involved in chip shots, is essential for improved performance in golf. Golfers who exhibit a strong command of the fundamental techniques are better able to execute shots consistently and accurately. By focusing on essential skills such as grip, stance, ball position, shoulder movement, and weight distribution, a structured learning approach can significantly enhance performance. Additionally, studies by Green et al. (2015) and Olivier et al. (2016) suggest that improvements in golf performance are linked to enhanced body control, swing mechanics, and movement adaptation, which can be achieved through targeted instruction and varied practice.

The importance of varied learning conditions is further supported by research in motor learning theory. This theory suggests that learning environments that incorporate task variability can improve a learner's ability to regulate movement and adapt their techniques to changing conditions. For example, by practicing chip shots under different green-area contours, students can develop a deeper understanding of the relationship between their actions and the outcomes of their shots. The ability to make quick adjustments to body position, ball placement, and swing mechanics is critical for effective performance, particularly in short-game situations where accuracy is paramount.

The role of instructional methods in enhancing learning outcomes is widely recognized in the literature. Previous studies have shown that varied practice environments promote skill retention and transfer, as learners are better able to generalize their skills to real-world situations. The station-based learning model, therefore, offers a promising approach to golf instruction by providing learners with exposure to diverse conditions and encouraging the development of adaptable skills. By engaging in structured practice sessions that simulate real-game scenarios, students can refine their chip shot technique and build the necessary skills to perform effectively in competitive settings.

This study aims to assess the effectiveness of a station-based chip shot learning model using a No. 9 iron on students' golf learning outcomes. Unlike traditional instructional methods that often rely on repetitive drills or limited task conditions, the station-based model provides a dynamic and contextually rich learning experience that encourages skill development through exposure to varied conditions. The research hypothesis posits that students who receive instruction through the station-based chip shot learning model will demonstrate significantly better performance in chip shot tasks compared to students who receive conventional instruction. This study seeks to explore whether such an instructional model can enhance students' golf learning outcomes and contribute to more effective skill acquisition in the context of short-game instruction.

METHOD

Research Design

This study used a quasi-experimental method with a posttest-only control group design. This design was selected because the available group comparison data consisted of final chip shot performance scores from an experimental group and a control group. The design allowed the researcher to examine the difference in learning outcomes between students who received the station-based chip shot learning model and students who received conventional instruction.

Table 1. Posttest-Only Control Group Design

Group	Treatment	Posttest
Experimental Group	Station-based chip shot learning model using a No. 9 iron	O1
Control Group	Conventional chip shot instruction	O2

In this design, O1 represents the final chip shot performance test administered to the experimental group, while O2 represents the final chip shot performance test administered to the control group.

Participants

The participants were 36 students involved in golf learning activities at Efro Golf Academy Bandung. The participants were divided into two groups: 18 students in the control group and 18 students in the experimental group. The control group received conventional chip shot instruction, whereas the experimental group received instruction using the station-based chip shot learning model with a No. 9 iron.

Research Variables

The independent variable was the station-based chip shot learning model using a No. 9 iron. The dependent variable was students' chip shot learning outcome, measured through a chip shot performance test. The main comparison focused on whether the experimental group achieved significantly higher performance scores than the control group.

Treatment Procedure

The experimental treatment was implemented through a station-based learning model. 24 The learning session began with dynamic stretching from head to toe to prepare students physically and mentally for chip shot practice. The core instructional activity focused on essential chip shot techniques, including grip, stance, ball position, head position, shoulder movement, left-arm control, elbow position, hip rotation, foot rotation, body-weight distribution, impact position, swing rhythm, tempo, and balance.

The station-based model consisted of five learning stations based on different green-area contours:

1. Chip shot learning on a flat green-area contour.
2. Chip shot learning on an uphill green-area contour.
3. Chip shot learning on a downhill green-area contour.
4. Chip shot learning on a green-area contour sloping to the left.
5. Chip shot learning on a green-area contour sloping to the right.

The No. 9 iron was used consistently during the treatment to help students build a stable sense of distance, ball contact, club control, and shot trajectory. After completing the learning stations, students performed cooling-down activities to help restore body condition and blood pressure to normal levels before returning to regular activities.

Research Instrument

The instrument used in this study was a chip shot performance test. The test was designed to evaluate students' ability to perform chip shots accurately and consistently under instructional conditions. The treatment model was reviewed by learning experts and obtained a feasibility percentage of 86.17%, indicating that the instructional model was very feasible for use in golf learning.

Data Analysis

9 The data were analyzed using descriptive statistics and an independent samples t-test. Descriptive statistics were used to calculate the mean, standard deviation, and standard error of the control and experimental groups. The independent samples t-test was used because the control group and experimental group consisted of different participants. The level of significance was set at 0.05. Effect size was calculated using Cohen's d to determine the magnitude of the treatment effect.

RESULT

Feasibility of the Treatment Model

The expert validation result showed that the station-based chip shot learning model obtained a feasibility percentage of 86.17%. This result indicates that the treatment model was categorized as very feasible and appropriate for implementation in golf learning activities. In the experimental study structure, this result served as supporting evidence for the appropriateness of the instructional treatment rather than as the main research finding.

Descriptive Statistics

The descriptive statistics showed that the experimental group achieved a higher final chip shot performance score than the control group. The control group obtained a mean score of 17.11, while the experimental group obtained a mean score of 23.39.

Table 2. Descriptive Statistics of Chip Shot Performance Scores

Group	N	Mean	Standard Deviation	Standard Error Mean
Control Group	18	17.11	1.32349	0.31195
Experimental Group	18	23.39	1.03690	0.24440

Hypothesis Testing

10 Because the control and experimental groups consisted of different participants, an independent samples t-test was used to examine whether the difference between the two's group means was statistically significant. The analysis showed a statistically significant difference between the control group and the experimental group.

Table 3. Independent Samples t-Test of Chip Shot Performance Scores

Statistic	Value
Comparison	Experimental group - Control group
Mean difference	6.28
Standard error difference	0.396
t	15.84
Degrees of freedom	34
Significance	p < .001
95% confidence interval	5.47 to 7.08
Cohen's d	5.28

The result indicates that the experimental group performed significantly better than the
18 control group. Therefore, the null hypothesis was rejected and the alternative hypothesis was accepted. The very large effect size suggests that the station-based chip shot learning model using
25 a No. 9 iron had a strong positive effect on students' chip shot learning outcomes.

DISCUSSION

The results of this study indicate that the station-based chip shot learning model using a No. 9 iron significantly improved students' chip shot performance when compared to conventional instruction. The experimental group, which was exposed to the station-based learning model, outperformed the control group, supporting the hypothesis that structured, contextually rich learning environments are more effective in enhancing skill acquisition in golf.
7 This finding aligns with the growing body of literature emphasizing the importance of diverse, task-specific learning conditions in sport education (Smith, 2014; Wilson & Kipp, 2016).

34 A key factor contributing to the superior performance of the experimental group was the varied learning environment offered by the station-based model. The exposure to different green-area contours flat, uphill, downhill, and sloping provided students with an opportunity to adapt their technique to different real-world conditions they would face on the golf course. This type of varied practice is crucial, as it has been shown to improve not only skill performance but also the ability to transfer learned skills to other contexts (Magill, 2011; Shea & Morgan, 2009). By practicing chip shots under different conditions, students were able to refine their ability to adjust their movements and optimize their shots, thereby improving their overall performance. This finding supports the motor learning principle that variability in practice promotes adaptability and strengthens motor control (Schmidt & Lee, 2011).

Another significant aspect of the station-based model was the use of a single club, the No. 9 iron, throughout the learning process. The consistent use of one club allowed students to focus on mastering the fundamental mechanics of the chip shot without the added complexity of adjusting to different clubs. Research by McGill (2014) has shown that the use of consistent equipment in skill training helps to simplify the learning process by reducing cognitive load, allowing learners to focus their attention on the critical aspects of performance, such as grip, stance, and body movement. This consistency helps learners build stable motor patterns, which is particularly beneficial for beginners and intermediate learners who are still mastering fundamental techniques (Green & Gallwey, 2009).

Additionally, the station-based learning model fostered an understanding of the relationship between action and outcome, a key concept in motor learning theory. Tanaka and Iwami (2018) suggest that golfers need to develop a deep understanding of how their actions, such as body positioning, swing mechanics, and weight distribution, directly influence the outcome of the shot. The varied conditions provided by the station-based model enabled students to experience firsthand how different factors, such as slope and green contour, affect the ball's
26 trajectory and distance. This experiential learning process enhanced their ability to adjust their technique in response to changing conditions, a crucial skill for performance in actual golf courses.

The improved performance of the experimental group can also be attributed to the emphasis on body control and balance, which are essential for executing accurate chip shots. According to McHardy and Pollard (2015), maintaining stability and proper weight distribution during the swing is critical for ensuring that the ball travels the desired distance and direction. The station-based model provided students with the opportunity to practice chip shots under varied conditions, which likely helped them develop better body control and balance, leading to more accurate and consistent shots. These findings are consistent with research by Weimer and Williams (2017), who found that targeted practice in varied conditions improves both the technical and cognitive aspects of golf performance.

The positive outcomes observed in this study also support the use of task-specific practice in skill development. The station-based model, by simulating real-world conditions,
19 allowed students to experience realistic golfing situations that required them to adapt their movements to specific task demands. As noted by Magill (2011), task-specific practice is essential for skill acquisition because it encourages learners to develop strategies that are directly applicable to real-world scenarios. By practicing under a variety of conditions, students were better prepared to handle the challenges they would face on the golf course, thus improving their overall performance.

20 Despite the promising results, several limitations of the study should be acknowledged. One notable limitation is the absence of pretest data, which could have provided a clearer
11 baseline for measuring the effectiveness of the instructional model. Future studies should incorporate pretest and posttest designs to better assess the impact of the station-based learning model on skill development. Additionally, the use of a posttest-only control group design limits
35 the ability to draw conclusions about the long-term effects of the instructional treatment. A longitudinal study, including follow-up assessments, would provide valuable insights into whether the improvements in chip shot performance are retained over time.

The sample size of 36 students is another limitation, as it may not be representative of
3 the broader population of golfers. Future studies should aim to include a larger and more diverse sample to enhance the generalizability of the findings. Moreover, the study focused solely on chip shot performance, and it would be beneficial for future research to examine the effectiveness of the station-based model in improving other aspects of golf performance, such as putting or driving. Additionally, including a wider range of skill levels, from beginners to advanced golfers, would provide a more comprehensive understanding of how the model impacts learners at different stages of development.

In conclusion, the station-based chip shot learning model using a No. 9 iron was found to be an effective instructional strategy for improving students' chip shot performance. The exposure to varied green-area contours, along with the use of consistent equipment, helped students develop better movement control, body awareness, and technical consistency. These findings highlight the importance of varied, task-specific practice in golf instruction and suggest
12 that station-based learning can be a valuable tool for enhancing short-game skills. Future research should explore the long-term effects of this instructional model and examine its applicability to other areas of golf performance.

CONCLUSION

39 This study concluded that the station-based chip shot learning model using a No. 9 iron had a significant effect on students' chip shot learning outcomes. The experimental group achieved

significantly higher scores than the control group, indicating that the model was more effective than conventional instruction in improving chip shot skills. The model is recommended for golf learning because it provides structured practice across varied green-area contours and supports students in developing accuracy, consistency, tempo, rhythm, and balance in chip shot performance.

Golf instructors may apply the station-based chip shot learning model as an alternative instructional strategy for short-game training. The five-station structure allows students to experience different green-area contours and provides a more realistic learning environment. The use of a No. 9 iron can also simplify the learning process by helping students focus on movement control and shot consistency.

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