

Digital logbook-based training monitoring improves adherence and dribbling through ladder drills in futsal

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Abstract

Research Problems: The study was motivated by the low level of training adherence among futsal players and the limited use of structured monitoring systems in ladder drill training programs, which may reduce the effectiveness of skill development. The purpose of this study was to develop and evaluate the feasibility and effectiveness of a simple digital logbook-based training monitoring model to improve training adherence and dribbling skills in futsal players. **Methods:** This study employed a Research and Development approach adapted from the Borg and Gall model. The participants were students of the Physical Education, Health, and Recreation Study Program at STKIP Yapis Dompus. Data were collected through observation, interviews, expert validation, digital logbooks, and dribbling skill tests, and were analysed using descriptive and quantitative techniques. **Results:** The results showed that the developed model achieved feasibility scores of 93% from both media experts and subject matter experts, indicating that it was highly feasible for implementation. The application of the model increased training adherence from 68.40% to 89.70% and significantly improved players' dribbling performance based on the comparison of pre-test and post-test results. These findings indicate that structured digital monitoring can enhance training consistency and skill development. **Conclusion:** In conclusion, the simple digital logbook-based training monitoring model is valid, practical, and effective for supporting ladder drill programs in futsal. The study contributes to digital-based sports training management and provides a foundation for future research involving different sports, training methods, and broader participant populations.

Keywords: digital logbook; training monitoring; ladder drill; training adherence; futsal dribbling.

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INTRODUCTION

Futsal is a team sport characterised by fast-paced play, limited space and high intensity, which demands optimal mastery of technical skills (Putra et al., 2023). One of the fundamental skills that plays a crucial role in determining the success of the game is dribbling. Dribbling enables players to maintain possession of the ball, get past opponents, create space on the pitch, and support the effectiveness of attacks and transitions (S. A. Pratama, 2020). Consequently, the development of dribbling skills is a key focus in futsal training programmes at various levels, ranging from schools and universities to competitive clubs (R. S. Pratama et al., 2024). Improvements in these skills are influenced not only by the individual abilities of the players but also by the quality of the training programme and the consistency of its implementation.

In sports coaching, the success of a training programme is largely determined by the application of training principles, which include specificity, continuity, progressiveness and individualization (Gofar et al., 2024). One training method widely used to improve footwork, coordination, agility and change of direction is the ladder drill. Various studies have shown that ladder drills can improve the bio motor components that contribute to the technical performance of futsal players, particularly dribbling skills (Zulfikar et al., 2024). The improved neuromuscular coordination gained through these exercises helps players control the ball more effectively in dynamic game situations. However, the effectiveness of a training programmed is determined not only by the design of the exercises used, but also by the athletes' level of adherence in carrying out the programmed consistently and continuously.

The issue of training adherence remains a challenge in various sports development programmed. Recent studies indicate that low adherence to training programmed by athletes has a direct impact on the failure to meet performance targets and slow progress in developing sporting skills. In the context of futsal, this issue is further complicated by the fact that the majority of training takes place outside the coach's direct supervision, particularly during self-directed training sessions. Preliminary observations carried out among students on the Physical Education, Health and Recreation programmed at STKIP Yapis Dompu indicate that the majority of players do not yet have a structured system for recording their training. Coaches still rely on direct observation and players' verbal reports, making it difficult to objectively monitor the frequency, duration, intensity and quality of training. This situation leads to variations in training execution between players and results in sub-optimal improvements in dribbling skills. This issue is significant as it directly affects the effectiveness of coaching, the quality of training programmed evaluation, and athletes' performance achievements.

Advances in digital technology have opened up opportunities to address the challenges of training monitoring through the use of digital recording and reporting systems (Dwi Kurniawan, 2025). In recent years, the use of digital technology in sport has increased, particularly to support performance evaluation, coaching decision-making and the management of training programmed. Research by Clemente et al in (María & Lozano, 2022) shows that the use of digital monitoring systems can enhance athletes' engagement in training programmed through faster and more measurable feedback mechanisms. Another study by (Jukic et al., 2020) found that digitally recording training activities can help coaches identify patterns of athlete compliance and make more precise programmed adjustments. Furthermore, a study by (Rinaldo et al., 2022) revealed that the use of monitoring technology contributes to

increased motivation and a greater sense of responsibility among athletes when undertaking independent training. Nevertheless, the majority of these studies have focused on the use of relatively complex technological devices and have not yet been widely applied in the context of futsal coaching at school, university or amateur club level.

On the other hand, research on ladder drills in futsal generally places greater emphasis on the impact of training on improvements in physical components and technical skills. A study by Hammami et al. in (Khanina et al., 2025) reported that ladder drill training significantly improved players' agility and ability to change direction. Similar findings were also reported by Chaouachi et al in (Padrón-Cabo et al., 2020), who demonstrated an improvement in dribbling ability following a training programmed based on coordination and foot speed. However, these studies are more outcome-oriented and have not extensively examined the aspect of training compliance as a factor influencing the success of training programmed. Consequently, there remain limitations in understanding how training monitoring mechanisms can support the sustained effectiveness of ladder drill programmed (Putra et al., 2023).

Based on this literature review, there are several research gaps that require attention. Firstly, there is a conceptual gap, namely the limited number of studies that integrate futsal technique training with a digital training monitoring system within a comprehensive development model. Secondly, there is a methodological gap, as most previous studies have used an experimental approach that merely measures changes in skills without evaluating the level of training compliance during the programmed. Thirdly, there is a contextual gap, namely the lack of research on the use of simple monitoring technology suited to the conditions of futsal development at universities, schools and amateur clubs in Indonesia. Fourthly, there is an empirical gap, as the relationship between training adherence and improvements in dribbling skills has not yet been extensively examined simultaneously within a single study.

In light of this gap, this study aims to develop and test the feasibility and effectiveness of a Simple Digital Logbook-Based Training Monitoring Model for the Ladder Drill Programmed to improve training compliance and dribbling skills among futsal players. Specifically, this study aims to: (1) develop a simple digital logbook-based training monitoring model suited to the needs of futsal coaching; (2) test the model's feasibility through validation by media and subject matter experts; and (3) evaluate the model's effectiveness in improving training compliance and dribbling skills among futsal players.

The scientific contribution and novelty of this study lie in the development of a training monitoring model that integrates a ladder drill programmed with a simple digital logbook within a single, structured coaching system. Unlike previous studies, which have focused more on training outcomes or the separate use of monitoring technology, this study combines aspects of the training process and outcomes through the continuous monitoring of adherence, consistency and skill development. The model developed does not require specialized devices or applications, making it more practical, cost-effective and easy to implement in various sports coaching contexts. Consequently, this study is expected to make a theoretical contribution to the development of sports coaching science, as well as a practical contribution in the form of an applicable training monitoring model to improve the quality of futsal coaching.

METHOD

This study is a research and development (R&D) project based on the Borg and Gall model (Farhana et al., 2021), which essentially consists of ten steps: (1) research and information gathering, (2) planning, (3) developing a preliminary version of the product, (4) preliminary field testing, (5) major product revision, (6) main field testing, (7) operational product revision, (8) operational field testing, (9) final product revision, and (10) dissemination and implementation. In this study, these ten steps were adapted and simplified into six stages in accordance with the research objectives, product characteristics, time constraints, and conditions of the research subjects, namely (1) needs analysis, (2) product design, (3) product development and validation, (4) limited testing and revision, (5) field testing and evaluation, and (6) final revision, finalization, and product dissemination. The first stage, needs analysis, is an adaptation of “research and information collecting” and was conducted through observations of futsal training sessions specifically ladder drills interviews with coaches, and a review of training program documentation to identify issues related to training monitoring, player compliance levels, and the need for a simple, user-friendly monitoring system (Iqbal, 2020)(Sugiyono, 2019). The second stage, product design, integrates planning elements and the initial development of a preliminary product form through the design of a prototype for a Simple Digital Logbook-Based Training Monitoring Model that includes player identification, training schedules, training types and durations, compliance levels, coach’s notes, monitoring summaries, user guides, as well as indicators of training compliance and dribbling skills tailored to the needs of futsal coaching (Putra et al., 2023). The third stage, product development and validation, is a continuation of the development of the preliminary form of the product; specifically, the designed prototype is validated by sports coaching experts and

learning technology experts to assess content appropriateness, indicator accuracy, practicality, ease of use, and product feasibility (Dwi Kurniawan, 2025), after which the validation results are used as the basis for product improvements. The fourth stage, limited testing and revision, integrates preliminary field testing and main product revision through testing with a number of futsal players to determine the instrument's readability, the ease of filling out the logbook, the clarity of instructions, and any technical obstacles that arise during product use, which subsequently serve as the basis for revisions prior to broader testing. The fifth stage field testing and evaluation integrate main field testing, operational product revision, and operational field testing by applying the product to a group of players under actual training conditions to measure training compliance and dribbling skills through pre-tests and post-tests. Training compliance is analysed based on attendance frequency, completeness of logbook entries, seriousness, and consistency in performing exercises, while dribbling skills are measured based on completion time and the number of ball losses (S. A. Pratama, 2020); the evaluation is also supplemented with coaches' notes and players' feedback to assess the practicality and acceptance of the monitoring model. The sixth stage final revision, finalization, and dissemination integrates the final product revision and dissemination and implementation through a comprehensive analysis of the validation and pilot test results, final revisions based on empirical findings, product finalization, and preparation of the product for dissemination so that it can be used as a simple, practical, and applicable training monitoring instrument in futsal coaching (Sandi Achmad Pratama , Mohammad Zaim Zen, 2023). Research instruments included an observation sheet, a semi-structured interview guide, a documentation study, a digital logbook prototype, a user guide, an expert validation questionnaire, a coach monitoring form, and a ladder drill-based dribbling skills test. The data were analysed using descriptive and inferential methods, with training compliance data analysed in terms of frequency, percentage, and average player compliance (Zulfikar et al., 2024), while differences in pre-test and post-test dribbling skill scores were analysed using a paired t-test if the data were normally distributed or the Wilcoxon test if the data were not normally distributed (Sugiyono, 2016). Correlation analysis was also conducted to determine the relationship between the level of training compliance and improvements in dribbling skills, while qualitative data from coaches' notes and players' feedback were used as supporting information to evaluate the product's practicality, ease of use, and potential for improvement. Thus, the adaptation of the Borg & Gall model in this study explicitly condenses the original ten steps into six development stages by integrating steps with similar functions, without eliminating the core elements of the process: needs analysis,

planning, development, validation, testing, revision, and dissemination (Syarifudin, Sulistyorini, 2018).

RESULT

1. Results of Model Development

This research has produced a Simple Digital Logbook-Based Training Monitoring Model, designed to support the implementation of ladder drill training programmes for futsal players. This model comprises several key components, namely player details, training schedules, training type and intensity, training duration, training compliance levels, coach's notes, and a summary of progress in dribbling skills, all of which can be accessed digitally. The model was developed to assist coaches and players in recording, monitoring and evaluating training in a more systematic, effective and well-documented manner. In addition to serving as a medium for recording training activities, this digital logbook is also designed as a means of communication between coaches and players so that the coaching process can continue even outside of face-to-face training sessions.

The development phase began with a needs analysis through field observations and interviews with futsal coaches and players. The results of the analysis showed that the training monitoring process currently in place was still manual and not optimally documented. Coaches generally rely solely on verbal reports from players or simple notes that are not systematically recorded, making it difficult for them to monitor the consistency of training, attendance levels, and the development of players' technical skills over time. Furthermore, the limited duration of training sessions means that coaches are unable to supervise all the independent training activities carried out by players outside of group training sessions.

Based on the results of observations and interviews, it was found that the majority of players do not yet have a structured and consistent training record-keeping system. Independent training activities are often carried out without clear documentation regarding training frequency, the types of exercises performed, or the results achieved. This situation has led to low levels of training compliance, as players lack measurable control and evaluation of the training programme provided. Furthermore, coaches also face difficulties in identifying the factors influencing the development of players' dribbling skills, as the available training data is very limited. Consequently, the process of evaluation and decision-making regarding further training programmes becomes less effective

These findings formed the basis for the development of a simple digital logbook, designed with ease of use, accessibility and user needs in mind. The model developed can be operated via a smartphone, enabling players to record their training activities anytime and anywhere. All training data entered is stored digitally and can be monitored by the coach in real time. Through this system, coaches can view players' adherence to training regimens, provide feedback on activities completed, and evaluate progress in dribbling skills based on the data collected. With more structured and documented records, the training monitoring process becomes more effective, transparent and accurate.

Overall, the Simple Digital Logbook-Based Training Monitoring Model developed in this study is expected to improve players' discipline and adherence to the ladder drill training programme, facilitate coaches' supervision and evaluation of training sessions, and provide valid data as a basis for decision-making in futsal coaching. The existence of this model also serves as an innovative alternative in the utilisation of digital technology to support a more modern, efficient, and performance-oriented approach to sports training, aimed at the continuous improvement of players' performance.

2. Expert Validation Results

Before being tested with users, the developed product is first validated by two validators one content expert and one media expert to assess the feasibility, content appropriateness, practicality, and media quality of the developed model.

Table 1. Media expert validation results

Evaluation aspect	Maximum score	Score obtained	Percentage (%)	Category
Visual design	20	18	90.00	Highly acceptable
Ease of use	20	19	95.00	Highly acceptable
Clarity of information	20	18	90.00	Highly acceptable
Navigation and access	20	19	95.00	Highly acceptable
System functionality	20	19	95.00	Highly acceptable
Total	100	93	93.00	Highly acceptable

The validation of the digital logbook developed was undertaken by media experts. The results of this validation process demonstrated that the logbook achieved a feasibility rating of 93.00%, which falls into the 'highly feasible' category. This percentage is indicative of the media design meeting key aspects of digital media development, including interface design, ease of navigation, clarity of information presentation, design consistency, and system functionality. The highest scores were obtained in the areas of usability and accessibility, indicating that the digital logbook can be easily operated by both coaches and players without requiring advanced technical skills. The simple interface and intuitive workflow facilitate efficient recording, monitoring and evaluation of training activities, thereby reducing the potential for errors in data entry. Furthermore, the facility for straightforward access to training histories enables coaches to undertake continuous monitoring of each player's progress, while players can engage in introspection regarding the consistency of their training sessions. The validation results demonstrate that the digital logbook is not only technically viable but also enjoys a high level of acceptance as a practical, effective, and suitable tool for monitoring training in modern futsal coaching. These findings are in alignment with the Technology Acceptance Model proposed by (Davis, 1989), which states that perceived ease of use is one of the main factors influencing users' acceptance and continued use of a technology. Consequently, the digital logbook developed in this study has considerable potential for extensive implementation as a training monitoring tool in various sports development programs.

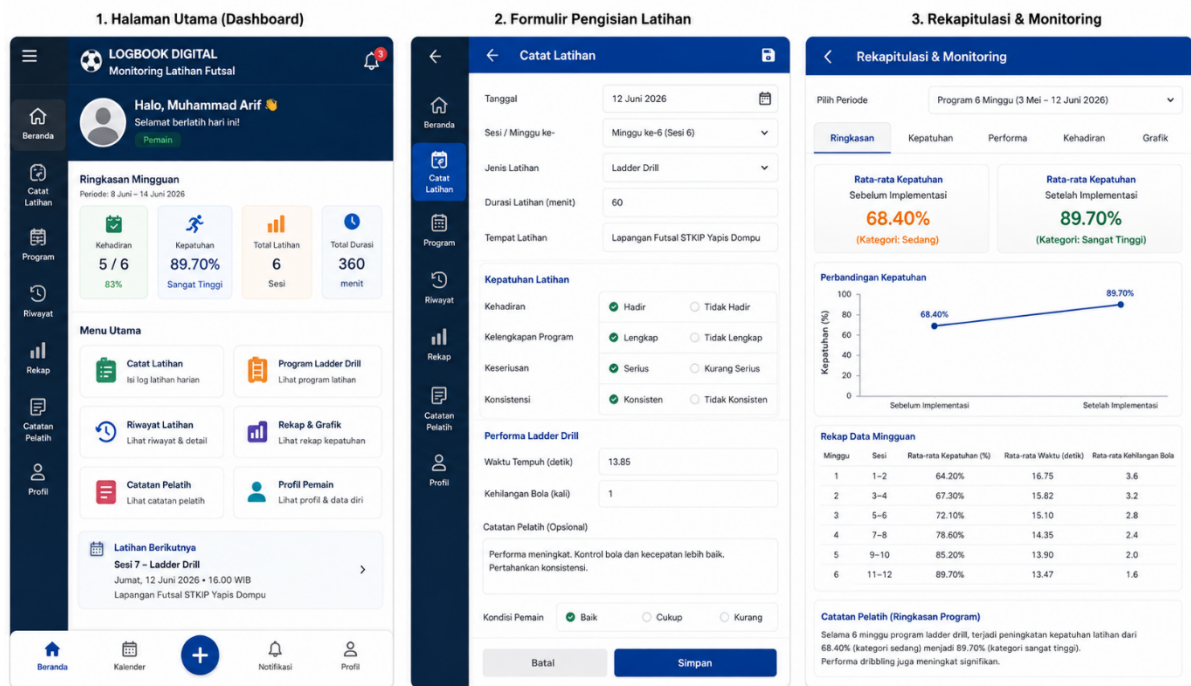
Table 2. Results of subject matter expert validation

Evaluation Aspect	Maximum Score	Score Obtained	Percentage (%)	Category
Appropriateness of Training Materials	25	23	92.00	Very Appropriate
Clarity of Compliance Indicators	20	19	95.00	Very Appropriate
Appropriateness of Dribbling Instrument	20	18	90.00	Very Acceptable
Relevance to Training Objectives	20	19	95.00	Very Acceptable
Ease of Evaluation	15	14	93.33	Very Acceptable
Total	100	93	93.00	Very Acceptable

The validation results, as determined by subject matter experts, demonstrated that the digital logbook developed achieved a feasibility rate of 93.00%, thus falling within the highly feasible category. This finding indicates that the content, structure, and components of the logbook are consistent with the principles of futsal training and the objectives of player skill development. This assessment encompasses the congruence of the material with the designated ladder drill programme, the perspicuity of training compliance indicators, the precision of the dribbling skill measurement instrument, and the pertinence of the information presented to facilitate the training monitoring and evaluation process. The logbook has been designed to document key aspects, such as attendance frequency, duration, intensity, completion of training programs, and progress in training outcomes. The logbook provides a comprehensive overview of players' consistency in following the training program as well as the development of their dribbling skills. This high level of feasibility indicates that the digital logbook serves not only as a medium for recording training activities but also as an evaluation tool capable of generating systematic, objective, and relevant data to support coaches' decision-making. The present findings are in alignment with those of Bompa and Buzzichelli in (Muzakki, 2020), who state that the success of a training programme is greatly influenced by the planning, implementation and evaluation processes conducted in a structured manner based on the principles of training periodization. These findings are also in alignment with the views of Borg and Gall in (Kurniawan & Khasanah, 2023), who emphasise that a research and development product must possess high content validity to be suitable for application in real-world conditions. Therefore, the results of the subject-matter expert validation demonstrate that the developed digital logbook meets the standards of substantive validity and has the potential to serve as an effective monitoring tool to support improvements in training compliance and dribbling skills among futsal players.

3. Field Trial Results

A field trial was conducted with 30 students from the Physical Education, Health, and Recreation program who participated in a six-week ladder drill training program.



Picture 1. Logbook digital

Table 3. Players' training compliance results

Variable	Before Implementation	After Implementation
Average Training Compliance (%)	68.40	89.70
Category	Moderate	Very High

The monitoring results indicate that there has been a substantial increase in the compliance rate of players with regard to their training, from 68.40% prior to the implementation of the digital logbook to 89.70% following its introduction. This 21.30% increase indicates that the implementation of a structured monitoring system encourages players to follow the training programme more consistently, with greater discipline, and more responsibly. The digital logbook facilitates the recording of all training activities, the monitoring of training progress on a regular basis, and the provision of feedback on the consistency of adherence to the training programme. Conversely, coaches gain access to systematically documented data, thereby facilitating the monitoring of attendance, frequency, duration, and completion of each training session. This approach engenders a more efficacious control mechanism in comparison with conventional record-keeping, as each training activity can be evaluated objectively and continuously. This increase in compliance suggests that the

utilisation of digital logbooks functions not only as a documentation tool but also serves to enhance athletes' awareness of the significance of consistency in adhering to the training programme. This finding is in accordance with the conclusions of Bompá and Buzzichelli in (Muzakki, 2020), who state that physical adaptation and improvements in athletic performance can only be achieved if the training programme is carried out regularly and continuously in accordance with the principles of periodization. In addition, Weinberg and Gould in (Muflih Wahid Hamid, 2024) posit that adherence to a training programme constitutes a pivotal indicator of successful athlete development, given its close correlation with an individual's motivation, discipline, and commitment to attaining performance objectives. The findings of this study demonstrate that the incorporation of a digital logbook as a monitoring system has a substantial impact on enhancing training adherence. This, in turn, serves as a pivotal foundation for the development of the technical skills and performance of futsal players.

Table 4. Pre-test and post-test results for dribbling skills

Variable	Pre-test	Post-test	Improvement
Dribbling Time (seconds)	15.82	13.47	14.85%

The results of the dribbling skill assessment demonstrated an enhancement in performance, as evidenced by a decrease in completion time from 15.82 seconds in the pre-test to 13.47 seconds in the post-test. This represents a gain in efficiency of 2.35 seconds after the players underwent the training programme. This reduction in completion time suggests that players were able to dribble with greater speed and efficiency while maintaining control of the ball throughout the designated course. This enhancement suggests that the integration of the ladder drill programme with a digital logbook-based monitoring system offers an effective training stimulus for developing the physical and technical components necessary for dribbling. These components include agility, motor coordination, stride speed, balance, and the ability to change direction quickly (Alp & Baydemir, 2019). These abilities are of critical importance in futsal, a sport that demands players to move nimbly, control the ball in confined spaces, and make rapid decisions under pressure from opponents. Furthermore, the utilisation of a digital logbook facilitates the consistent adherence to the training programme, thereby contributing to the enhancement of dribbling skills. These findings are in alignment with the motor learning theory proposed by Schmidt and Lee in (Maharaja et al., 2025), which states that the development of motor skills occurs through repeated and continuous practice, leading to neuromuscular adaptation, improved coordination, and enhanced movement efficiency. The

findings of this study corroborate the perspective of (Sheppard & Young, 2006) that structured agility training can enhance acceleration, deceleration, and change of direction speed, which are pivotal components in dribbling performance in team sports.

Table 5. Results of the Paired t-Test

Variable	t-value	Sig. (p)	Notes
Dribbling Skills	6.842	0.000	Significant

Statistical analysis demonstrated a significance level of $p < 0.05$, indicating a substantial discrepancy between pre-test and post-test dribbling skill scores following the implementation of the digital logbook-based training monitoring model. The findings demonstrate that the developed model has a positive impact on the improvement of futsal players' dribbling skills. This enhancement serves to illustrate that the implementation of a structured monitoring system, utilising a digital logbook, can enhance players' adherence to the consistent execution of the training programme. Consequently, this leads to an enhancement in the efficacy of the training process, resulting in an improvement in technical performance. It is evident that a rudimentary digital logbook-based training monitoring model functions not solely as a tool for the documentation of training activities, but also as a mechanism for control and evaluation, thereby underpinning the ongoing success of the training programme.

Table 6. Correlation results between training compliance and improvements in dribbling

Variable	Correlation Coefficient (r)	Category
Training Compliance and Dribbling Improvement	0,71	Strong

The findings of the correlation analysis demonstrate a robust positive association between the degree of adherence to training regimens and enhancements in futsal players' dribbling proficiency. The findings of this study indicate that there is a direct correlation between adherence to the training programme, as indicated by adherence to the schedule, intensity, and established procedures, and the improvement in dribbling skills achieved. Adherence to a rigorous training programme is conducive to the optimisation of physiological adaptation, technical mastery and motor coordination. Conversely, a lack of adherence to the training programme has the potential to reduce its effectiveness because the frequency and quality of training sessions become inconsistent. Consequently, the utilisation of a digital logbook-based training monitoring system is imperative in enhancing player compliance through the systematic documentation, surveillance, and assessment of training exercises, thereby leading to a substantial enhancement in dribbling proficiency.

DISCUSSION

The findings of the research indicate that the digital logbook-based training monitoring model developed is valid, practical, and effective for implementation in a ladder drill programme for futsal players. The elevated level of validity ascertained through the consensus of media and subject matter experts signifies that the developed product is congruent with the stipulated learning objectives, content, media presentation, ease of use, and relevance to the requisites of futsal coaching. This validity indicates that the monitoring instrument is not only suitable for use as a medium for recording training activities, but is also capable of serving as part of a systematic training evaluation system. This finding is in alignment with the principles of research and development, which stipulate that an educational product must undergo stages of validation, revision, and pilot testing in a phased manner to produce a product suitable for application in real-world conditions Borg & Gall in (Kurniawan & Khasanah, 2023). Consequently, the digital logbook developed is not only theoretically feasible but is also practically acceptable to users, including coaches and athletes.

The model's practicality is also evident from the results of field trials, which showed that coaches and players were able to use the digital logbook without encountering any significant technical issues. The tool's interface is uncomplicated, the process of entering training data is straightforward, and the tool enables rapid access to training history. These characteristics contribute to the tool's enhanced efficiency in comparison to manual record-keeping methods. In the domain of sports coaching, ease of use constitutes a pivotal aspect, as a monitoring system that is excessively intricate risks diminishing its utilisation over time. This finding is consistent with the Technology Acceptance Model, which posits that perceived ease of use exerts a significant influence on the acceptance and continued utilisation of a technology (Davis, 1989). Consequently, the technology-based approach employed in this study constitutes a significant strength of the model, given its capacity to be implemented in educational institutions with limited technological resources without compromising its primary function as a training monitoring instrument.

The enhancement in the adherence to training protocols subsequent to the integration of a digital logbook signifies that a systematic monitoring approach can foster enhanced discipline, responsibility, and commitment among athletes towards the training programme meticulously designed by the coaching staff. Training compliance is a pivotal factor in determining the success of athlete development, as physiological adaptation and skill improvement can only occur when training is performed consistently over a specific period of

time. The principle of continuity in training periodization posits that a programme's success is contingent on the consistency of training execution in accordance with the planned intensity, frequency, and volume Bompa & Buzzichelli in (Muzakki, 2020). In this study, the digital logbook provides feedback that enables players to monitor the regularity of their training, thereby cultivating intrinsic motivation to maintain training consistency. Furthermore, coaches have the capacity to utilise systematically documented data in order to identify players who are experiencing a decline in adherence, thus enabling more rapid and targeted interventions.

The findings of the research study demonstrated a marked enhancement in the dribbling proficiency of the players following their engagement in a ladder drill program that was meticulously monitored through the utilisation of a digital logbook. This enhancement suggests that a combination of suitable training methodologies and an efficient monitoring system can have a favourable effect on the progression of players' technical capabilities. In accordance with the principles of motor learning theory, the development of skills is facilitated by repeated practice, resulting in neuromuscular adaptation that enhances coordination, precision, and movement efficiency Schmidt & Lee in (Maharaja et al., 2025). The ladder drill programme that was implemented in this study was designed to improve foot coordination, agility, balance, stride speed, and change-of-direction speed. All of these components are fundamental skills that are crucial to a player's success in dribbling during futsal games, which are played at a fast pace and in confined spaces.

The reduction in dribbling time observed in the post-training programme period suggests that players attained enhanced ball control without compromising on velocity. This efficiency in movement suggests that there has been an improvement in the coordination between the nervous and muscular systems, enabling players to change direction quickly while maintaining control of the ball. Systematic agility training has been demonstrated to enhance acceleration, deceleration, and changes of direction fundamental components in team sports (Sheppard & Young, 2006). Consequently, the enhancement in dribbling proficiency exhibited in this investigation was impacted not solely by the adeptness in fundamental techniques, but also by the augmentation of physical conditioning, specifically agility and motor coordination, which were cultivated through ladder drills. These findings are consistent with the research by (Zhao et al., 2026), which demonstrated that programmed agility training contributes to improved technical performance in team sport athletes.

The implementation of a correlation analysis revealed a strong relationship between adherence to training regimens and enhancements in dribbling proficiency. The findings

suggest that players demonstrating higher levels of training adherence experience enhanced skill development in comparison to those exhibiting lower levels of consistency in adhering to the training programme. These findings lend support to the sports psychology theory, which posits that adherence to a training programme constitutes a pivotal indicator of successful athlete development, given its association with motivation, engagement in the learning process, and athletic performance Weinberg & Gould in (Muflih Wahid Hamid, 2024). In addition, research by (Wilson et al., 2008) demonstrates a positive correlation between athletes' adherence to training programmes and enhanced performance, as well as the successful attainment of training objectives.

In contrast to the findings of earlier research, the majority of studies on ladder drills have concentrated on the impact of such exercises on enhancing agility, speed, balance, and dribbling skills. This study provides a novel perspective by demonstrating that the success of a training programme is influenced not only by the training methods employed, but also by the presence of a monitoring system capable of ensuring consistency in exercise execution. The integration of a digital logbook of a simple nature serves to expand the use of technology in the domain of sports coaching, particularly in the context of monitoring training compliance. These findings are in alignment with those of (Bartlett, 2007), who emphasised that sports technology serves not only as a tool for measuring performance but also as a means for data-driven decision-making in the coaching process.

From an implementation perspective, the monitoring model developed offers several advantages. In addition to its user-friendliness, the system does not require specialised hardware or complex applications, thus rendering it applicable at various levels of sports development. These levels include, but are not limited to, schools, amateur clubs and regional athlete development programmes. The advent of digitally stored training data has also facilitated the evaluation of athletes' progress, the design of subsequent training programmes, and the more systematic documentation of training histories by coaches. The utilisation of technology in sporting contexts must facilitate the provision of accurate, readily accessible information to support the decision-making processes of coaches (Hughes et al., 2019). Consequently, the digital logbook developed in this study fulfils these criteria and can serve as a cost-effective and readily implementable alternative solution for futsal development.

The study's findings indicate that the incorporation of basic technology, namely a digital logbook, into the ladder drill programme, has a substantial impact on enhancing training adherence and dribbling proficiency among futsal players. The effectiveness of a training

programme is determined not only by the quality of the training methods applied, but also by the presence of a monitoring system capable of maintaining consistency in training implementation, providing continuous feedback, and supporting data-driven evaluation processes Bompá & Buzzichelli in (Muzakki, 2020); (Hughes et al., 2019). Consequently, a rudimentary digital logbook-based training monitoring model can be advocated as a pragmatic innovation in futsal coaching, with the capacity to enhance the efficacy of training management and athlete performance.

CONCLUSIONS

The present study has produced a Simple Digital Logbook-Based Training Monitoring Model, which has been proven to be valid, practical, and effective in supporting the implementation of a ladder drill programmed to improve futsal players' training compliance and dribbling skills. The findings indicate that the implementation of a digital logbook facilitates the monitoring of training activities by coaches in a more systematic, documented, and sustainable manner. Additionally, it has been observed that players exhibit a heightened level of discipline and consistency in their adherence to the training programmed when utilizing this method. These findings expand the current understanding of the factors that determine the success of a training programmed. It is evident that the success of a training programmed is not solely determined by the training methods employed, but also by the presence of an effective monitoring system. Such a system ensures consistency in training implementation and provides objective data for the evaluation of athletes' progress. In addition to providing practical contributions to futsal coaching, this model demonstrates that the use of simple digital technology can serve as an efficient solution to improve the quality of training, supervision and evaluation without requiring complex systems. Consequently, the model has the potential to be applied to various other sports development programmed that require structured training monitoring. However, the study is subject to certain limitations regarding the number of subjects and the duration of implementation; therefore, further research is recommended to test the model on a larger sample, over a longer training period, and across different sports and skills to obtain stronger evidence regarding the effectiveness and generalizability of the digital logbook-based training monitoring model.

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