An Iterative Expert System for Track and Field Teaching Research in the Long Jump

Hsiang-Ming Ho and Huay Chang

Abstract—**This work focuses on the research of track and field sport. An e-Learning platform expert system is constructed as the base to design the track and field network teaching in the long jump. The expert system is applied into the research that constructs the interactive teaching of track and jump by the e-learning platform. Finally, this work employs the network teaching platform to implement the new teaching mode and learning channel. Numerous tests have been made to demonstrate the merits of the proposed issue.**

Index Terms—**E-learning, track and field teaching, expert system, interactive system.**

I. INTRODUCTION

The research of how to improve the efficiency of the track and field sport becomes one of the important issues in the sport fields. As discussed in the literature [1]-[12], in order to teach the varsity of track and field at school, the teachers need to find new data often. But it is always difficult to find new teaching data of track and field. Therefore, this paper employs the e-learning platform in the teaching of track and field. This new method not only helps the students understand the track and field clearly but also creates the students' better performance in the track and field sport. The e-learning teaching method also breaks through the limitation of teaching and promotes the track and field sport.

A. Research Motive

At present time, most research of the track and field focus on physiology and biomechanics instead of teaching practical research. Therefore, there are plenty of further chances in researching how to apply the e-learning platform into the teaching of track and field [1], [5], [9], and [12]. This paper provides an e-learning platform that can be used in the teaching of track and field. This teaching mode provides the reference basis for the researchers of the sport education area and the teachers who teach physical education. The advantages of using e-learning platform in network teaching are the share of resources and the unlimited of space and time. Once the e-learning platform applies into the teaching courses of track and field, the beginners of the track and field gains a beginning channel and learning resources. This is the

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first research motive. An interactive basis is required in any kinds of learning programs that strengthens the learning effect, corrects the learning concept and forbids falling into the wrong learning process. E-learning provides an interactive function that makes learning become an interactive communication and achieves efficient learning and correct learning. That is the second research motive. After the abandon of learning barriers and the gathering of people with same interest that would spread out the sport of track and field gradually. The sport of track and field becomes a kind of sport that anyone can join easily. This is the third research motive.

B. Research Objective

There are three research objectives in this research: Create new teaching mode and learning channel for the teaching of track and field, Apply e-learning platform and construct the interactive teaching of track and field, and create the promotion of the sport of track and field and reach the learning new chance.

The structure of this paper is stated below. The literatures of the track and field are discussed in Section 2. The research methodologies are discussed in Section 3. The Section 4 introduces the iterative expert system of network teaching platform. The conclusions are introduced in Section 5.

II. LITERATURE REVIEW

The related knowledge of the track and field in long jump is introduced in this section. Such as: competition rules, ground introduction, technique learning and the characteristics of e-learning, etc.

A. Track and Field

1) Track and field in long jump

The history of jump is over two thousand-year history. Far from 708 years before century, the Old Greek set the jump competition program in the eighteenth Old Greek Olympic Game. England is the first country to set the jump program in the sport competition. In 1860, Wupal is the champion of the sport competition of English Oxford University. His record is 5.27 meters. The first women jump competition is held in America in 1895. The men jump competition is set up in the Olympic Game in 1896. The women jump competition is set up in London Olympic Game until 1948 [2]-[4].

2) The knowledge of track and field

The tennis instruments, match rules and grounds are described in this section.

1) Competition Rules. If the numbers of the sportsmen in the competition exceed eight, there is a pre-competition.

Each sportsman has three trial-jump opportunities in the pre-competition. The time of the trial-jump is one minute. Only eight sportsmen with better grade can join the final-competition. Once there are more than two sportsmen has the same grade and rank the eighth, they can join the final-competition together. All the sportsmen have three trial-jump opportunities in the final-competition. The sportsman with the best grade in the pre-competition will be arranged to attend the trial-jump at last. And the worst will be the first one to attend the trial-jump. If there are fewer than eight sportsmen own the opportunities to attend the final-competition, each sportsman has six trial-jump opportunities. At the final stage of the competition, the trial-jump can be two minutes. The last sportsman has five minutes. The best grade for the sportsman in the pre-competition and final-competition will be the best grade for the sportsman in the competition. There is an example in Table I. The champion is C, the second place is A and the third place is B.

TABLE I: GRADE SAMPLE IN THE JUMP COMPETITION

Sportsman	1st Jump	2nd Jump	3rd Jump	4th Jump	5th Jump	6th Jump	Grade
A	5.21M	X	5.80M	-	5.52M	5.66M	5.80M
B	5.10M	5.36M	-	-	5.20M	5.66M	5.66M
C	5.80M	5.62M	5.85M	-	5.40M	X	5.80M
D	V	5.66M	5.33M		X	5.20M	5.66M
X: Fail in the trial-jump				-: Absent in the trial-jump			

The measure of the distance is from the treadle and the point where the sportsman falls. As shown in Fig. 1.
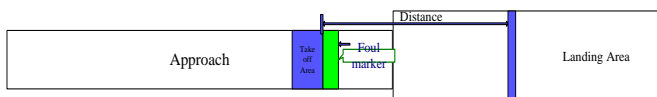

Fig. 1. The measure of the distance.

2) The Jump Ground. There are two types of the runway: cinder runway and plastic runway.

3) The techniques of track and field

The phases of the techniques of track and field include approach, take and flight in the air. The detailed introduction is listed below:

1) Approach. It varies from the sportsmen. It's around 25 meters to 30 meters. Those sportsmen who run faster can have longer approach distance.

2) Take Off. There are two parts of take off. The first is the preparation before the take off. It should be prepared in front of the 5 steps before the take off. The second is the take off at the treadle. This action is the key factor to gain better grade. An efficient take off should lower down the horizontal speed and gain an appropriate vertical speed to arrange a take off degree. Twenty degree is a reasonable take off degree for the sportsmen to gain a better grade.

3) Flight in the Air. There are four types of the flight in the air. The sail type is used by the beginners to get good grade. The hang type is used by most of the excellent sportsmen. The detail introduction is listed below:

The Sail: It is used by the beginners often. As shown in Fig. 2.
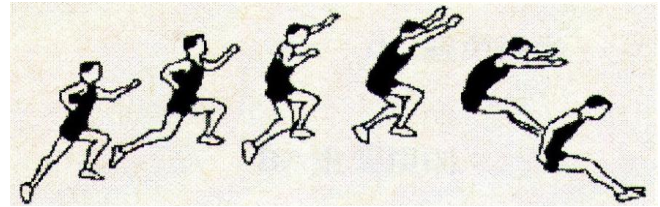

Fig. 2. The sail (400M of track and field).

The Hang: The upper part of the body should bind like a bow to forbid rotation. As shown in Fig. 3 [8].

Fig. 3. The hang.

The Hitch-kick: The arm and leg shake in a cross way to forbid rotation. As shown in Fig. 4 [8].

Fig. 4. The hitch-kick.

The Combination of the Hang Hybrid and the Hitch-kick: The landing has two types…
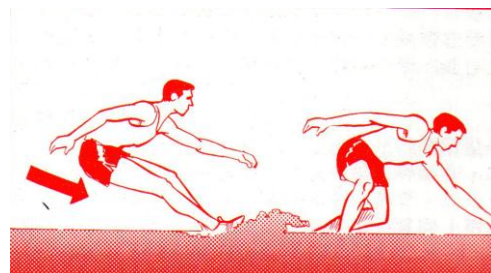
*The side-fall landing technique. As shown in Fig. 5 [8].

Fig. 5. The side-fall landing technique.
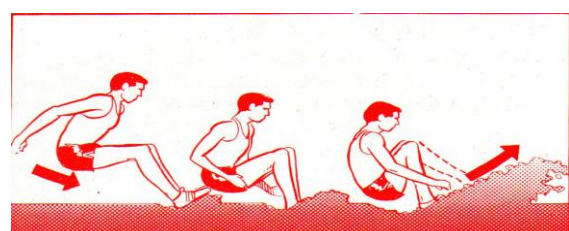
*The scoop landing technique. As shown in Fig. 6 [8].

Fig. 6 The scoop landing technique.

B. E-Learning

1) The introduction of e-learning

The term of e-learning was submitted by Jay Cross in 1998. Jay Cross pointed that the key point of e-learning should be focused on learning instead of 'e'. It means that the information technique is not the key issue. The applying subject field is the important point. The e-learning owns the same concept of Web 2.0. From the view point of e-learning 2.0, the tradition e-learning uses the internet technique to transfer the learning contents to the students only. In the contrast, the environment of the new e-learning emphasizes social learning and the use of social software [2]-[4]. The on-line e-learning uses the network techniques to transfer various kinds of solution, knowledge and increase the learning effect.

2) Characteristics of e-learning

The e-learning mode combines the communication, computer and multi-mediums. It breaks through the limitation of space and time. Turning around from the traditional education training type to the learning method of using internetwork, the e-learning provides an unlimited learning method for the learners. The six characteristics of e-learning [1] are: i. Equal Education Opportunity. ii. Unlimited learning. iii. Individual education. iv. Suitable personal development. v. Create global viewpoint. vi. Self-management training.

3) Construction of e-learning

There are three basic standards of e-learning construction:
1) The Creation Network of On-line learning. The teaching and information contents of e-learning can be updated instantly, stored safely and distributed rapidly.
2) The Usage of Standard Internet Technique Of On-Line Learning. The contents of e-learning can be transferred to the end-users under standard agreement.
3) The global learning contents of on-line learning. The contents of e-learning exceed the tradition education mode and provide better solutions for the learners.

4) Strengths of e-learning

There are five strengths of e-learning: 1) Good accessible, 2) Very adaptable, 3) Interactive, 4) Self-spaced and 5) High cost effective.

III. RESEARCH METHODOLOGIES

In order to construct our e-learning teaching platform of track and field, we made a literature analysis first. Then, we observed many e-learning teaching platforms those are used by many people today.

A. Research Method

In the beginning, we found many literatures those are related to e-learning and the track and field. We decided the knowledge structure and the relationship between the track and field and the e-learning. We also planned the construction rules of the e-learning teaching platform. All the sources of the literatures are professional text books, journals and research reports, etc. All the results created from the work of analysis, comparison and integration become the theoretical basis of this research. Besides that, the advantages of the other e-learning teaching web-sites are used as the factor in the cross-analysis. The e-learning teaching platform submitted in this paper should be widely used and contain precious teaching materials.

B. Research Steps

The research steps to employ e-Learning Platform for the Track and Field Teaching Research in the Long Jump is shown in Fig. 7.
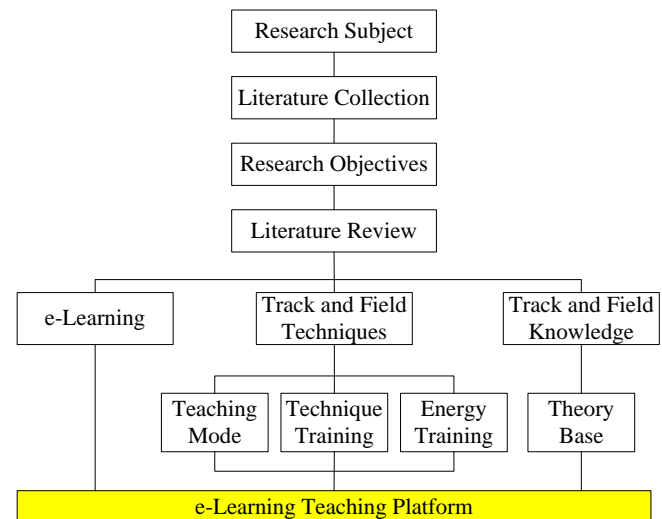

Fig. 7. The research steps to employ e-learning platform for the track and field teaching research in the long jump.

IV. THE ITERATIVE EXPERT SYSTEM OF NETWORK TEACHING PLATFORM

This paper uses the following items to construct an excellent e-learning teaching platform:

A. Collect Teaching Issues to Meet the Learners' Requirements and Background

The platform includes the beginning class to the advance class. Different teaching materials are designed for different levels. In order to increase the passion of learning, lots of writing is replaced with multi-medium contents. The interactive teaching method is used, too. The video materials are taken by the specialists. All the video materials are uploaded to the e-learning platform and can be used repeatedly by the learners. This method help the learners understand the detailed steps clearly.

B. Plan the Interactive Functions to Increase Learning Effect

Even the traditional teaching programs provide an interactive function. Not to say the e-learning platform designed a bunch of interactive methods for the teachers and the learners. These methods are discussion area, message board and chat room. Besides the problems can be solved easily, the learners can work together as team to exchange learning experience and extend learning programs then.

C. Design the User-Friendly Interfaces

The e-learning teaching platforms should provide the learners with easy-operating function, easy-learning

materials and one-style interface design. These advantages can help the learners not only understand the whole learning flow in a short time but also use the course materials without difficulty. The personal learning policy can be planned in this platform, too.

D. Create a Teaching Platform with Complete Functions

Based on the former three points, this paper designed the e-learning teaching platform, as shown in Fig. 8.

The descriptions of each function are:

1) Bulletin. This bulletin provides messages for all the people who are interested in the track and field sport. They can gain the news, importance, activities and information.
2) Courses. The courses are designed into different levels for the learners.
3) On-line Teaching. The technique teaching program is the major part of the courses design. The knowledge teaching is the minor part. Combining the video medium teaching mode with the flash animations and text description, the courses are designed in the e-learning teaching platform. This on-line teaching mode combines with the repeatedly watching mode increase the learners' technical learning effect without fail.
4) Ground and Rule. The detailed ground plan, the judgment assignment and the competition rules are described carefully.
5) Suggestions Ground. This ground includes the discussion area, message board and e-mail. It provides a ground for the learners to share learning experience. It also provides a two-way communication channel for the learners and the profession coaches.

V. CONCLUSIONS

The constructions of e-learning expert system teaching platform submitted positive effects in the field of track and field teaching stated below.

Convenient learning channel: Anyone who can access to the internet can access to the teaching platform. It is very convenient for the learners to select the appropriate materials for learning. All the track and field sportsmen can exchange their learning experience in this platform. The interactive communication can reduce the occurrence ratio of sport injuries and good for the development of track and field sport. Multi-type learning contents: The computer can display text, pictures, audio and video. The track and field learning includes the recognition of the sport equipments, the rules and the grounds. The most important thing is the repeated learning of professional techniques.

Therefore, the learners can learn the complicate, sequential postures in the teaching platform repeatedly. Combining with the explanation, the learners can learn more efficiently. Especially the display of the wrong track and field sport postures can help the learners forbid from sport injuries: On-line communities. Anyone who played the track and field for quite a long time also owns the personal specific learning experience besides the track and field coaches. Therefore, the learners can gain the experience of sport injuries from the track and field teaching platform. The learners also can share their own track and field sport experience with people in the platform. Real time message transferring: Anyone plays as a message receiver and message sender in the network. This type fastens the message transferring speed, strengthen the attraction of the track and field sport and increase the centripetal of the track and field community.
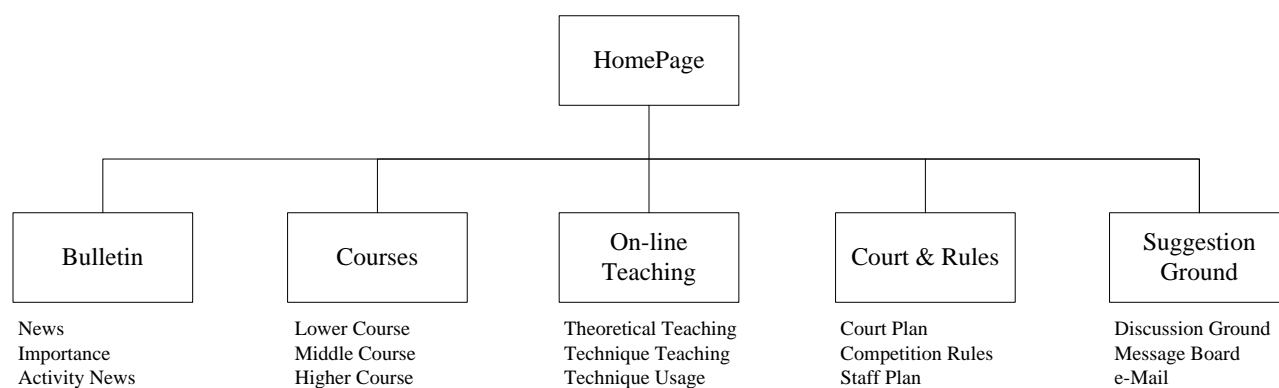

Fig. 8. The e-learning teaching platform for the track and field teaching research in the long jump.

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