# The Impact of Using "@ViS – MOLE" Software on Students Achievement in Sports Skills

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Received: 19 October 2020
Received in revised form: 22 November 2020
Accepted: 1 December 2020
Published: 15 December 2020

**ABSTRACT**

Technology applied to sport is playing an important role both in the daily training and competition environment, and its use and application can be seen to accelerate with each successive season. The rapid development of an increasingly high-tech world nowadays requires teachers to use technology in teaching because multimedia acts as a facilitator and can be a substitute for teaching and learning but controlled by instructors. Many sports generally have embraced technology and are now at the cutting edge of research and development. This study investigated the mastery of skills movement through the use of a multimedia learning software integrated video analysis and simulation technology for sports science. However, this paper will highlight the impact of using @ViS – MOLE software on students' achievement in sports skills. The software was used to observe the changes in students' achievement in the practical tests and the results of students' achievement in the practical tests recorded a mean value of 9.51 from a full score of 10 marks, based on the observation of a video recording, the 9 students had higher mean values of mean = 4.11 and this finding was supported by interviews that the students diligently had mastered and performed the skills. In conclusion, the findings of the study showed that the integrated technology has a positive impact on the level of mastery in movement skills.

**Keywords**
Learning software technology; Achievement in Movement learning; Sports skills.

## Introduction

Students in this era of ICT are developing differently in terms of their values, ways of thinking, ways of acting, motivation sources, ICT skills, age, ethnicity, economic group, religion, work experience, etc. (Mohamad Bilal Ali, 2009). Other changes that have occurred in this era include the goal of learning towards developing the overall human potential, the concept of lifelong learning, learning without the constraints of time and space, learning according to one's requirement and styles as well as student-centered curriculum (Nan-Zhao, 2006). The different stages in the evolution of education have slowly changed the methods for teaching and learning. Thus, in keeping with the times, the teaching and learning process should also be infused with the use of technology, depending on learning suitability (Adjah Naqkiah Mazlan, Jamalludin Harun, Zainal Abidin Zainuddin, 2012). Teaching methods have also change from being teacher-based to student-based. According to Mohamad Bilal Ali (2009), the role of teachers has evolved from being the main source of knowledge into facilitators. These developments had transpired concurrently with the development of technology in education.

Thus, through the keep changing era, the education system should go hand in hand with the progress of the world where the practice of the use of technology in the learning process should be compulsory. According to Abang Ismail and Mohd Taib (2007), T&L process should be using the technology such as the use of multimedia because the advantages is not only as a facilitator but it also is a substitute or support the teaching and learning process conducted by the trainers in delivering information. Its shows that in this new environment, the T&L process should be infused with the use of materials suitable for a specific learning technology. However, many issues deal with students and others in all learning process and the T&L of movement skills in sports is no exception. In various aspects, students involved in sports demonstrate a lot of individual differences, each having their own learning style (Julismah Jani et

al. 2009). In fact, most individuals are different in many ways: skills, behaviors, interests, talents, abilities and attitudes. These differences should be given special attention in order to produce a more meaningful learning (Wegerif, 2007; Mohnsen, 2008; Julismah Jani et al., 2009; Hu and Webb, 2009; Papastergiou, 2010).

Students are often plagued with various problems in learning movement skills. According to the previous research, the problem can be described in many constructs such as learning strategies, individual differences, learning materials and so on. The existing learning process does not allow students to choose and follow their own phases. Not only they are not able to apply their skills at times due to lack of experience, they must also follow instructions from their instructors. This existing process needs to be transformed because the concept of "one to fit all" is no longer appropriate to deal with the demands of sophisticated learning (Mohamad Bilal Ali, Baharuddin Aris & Mohd Salleh Abu, 2008; Boon & Leng, 2005). Furthermore, students are from different sports–they possess different skill levels. Therefore, the process of T&L should be implemented effectively so that these students can understand information and avoid problems in learning movement skills and students can trigger their achievement in sports.

## Literature Review

In general, in sports science it involves human movement. Every sport such as netball, football, hockey and so on involves movement in the skills performed. According to Julismah Jani et al. (2009), learning that involving sports should be implemented theoretically and practically because it involves the study of human behaviour in sports activities to improve the performance of human motor behaviour or movement of skills to the optimum level. The combination of theoretical and practical teaching techniques is very helpful in sports skills because it involves demonstrations domestically or in other words involves the sense of sight. Information is easier to convey with teaching techniques like this because according to Collinson (2000), some show great talent when using visual perceptions that involve sight directly.

Demonstration is important in learning the movement of sports skills and it is also related to learning theory because it is a guide and observation. Training sessions should include activities that can allow the transfer of learning in maximum quantities. In skills, training is divided into two, namely partial training and overall training. Teaching skills in training sessions usually depends on how the skills are taught. For complex skills routines such as gymnastics, a simple teaching method is to use a partial teaching method. For skills that are more dynamic or that involve continuous skills such as golf or tennis, the teaching of skills as a whole is encouraged so that students can experience the resulting skills correctly and then be able to master the skills easily. However, comprehensive teaching first and then to small skills is also often practiced because students should be exposed to real situations to help describe the movement of skills that they must master.

Skills are the learning ability to produce encouraging results with maximum efficiency, minimal use of time or energy at once. In skills, performance refers to goal setting, consistency, learning and training, high quality, minimal energy consumption, maximum efficiency and so on (Peter, 2009). Classification in the movement of skills usually involves the use of muscles such as the use of large muscles (gross) and small muscles (fine), environmental factors resulting from external or internal, the level of difficulty where it refers to something simple to more complex and so on. Skill movements involve basic movements, general movements and specific movements. There are various types of skill movements available and one example of a skill movement that is often performed is such as creative movement. The types of movements that exist in creative movement are such as non-locomotors, locomotors and manipulative movements.

In the field of sports, the movement of skills is very important because it is related to performance. According to existing studies such as the study conducted by Cheui Keen and Rio Sumarni (2010), studies related to the movement of skills should take into account Simpson's psychomotor domain. This domain helps in identifying the performance and level of movement produced through the available subjects. There are various sports subjects that involve movement such as sports skills subjects, biomechanics, adaptive sports, physical fitness and so on. These subjects involve theoretical and practical achievers. This is supported by Julismah et al. (2009) where according to them teaching and learning strategies need to be implemented theoretically and practically because this subject involves the study of human behaviour in sports activities to improve the performance of human motor behaviour to the optimum level. Existing knowledge should also be given priority because knowledge of learning involves the level of maturity from the aspects of physical, mental and emotional development.

However, the issue lack of using the technological materials in the teaching and learning process is also associated with the problem of skill movement learning. Most educators think that teaching using demonstration techniques alone can solve movement problems in skills. This also shows that skills movement analysis techniques are not practiced in the process of teaching and learning skills movement. However, this issue not only involves the teaching process but also involves the assessment process in the achievement of student skills.

Accordingly, failure to apply the movement of skills will have an impact on various parties and this shows that students cannot master the skills easily and effectively. Movement skills are very important to learn and apply because they help in producing more effective movements. In terms of sports development, failure to master the movement of skills will lead to the formation of poor-quality athletes. This failure may also be due to a lack of self-confidence to produce a skill movement because the level of confidence of an athlete is important. Indirectly, it gives a great impact to the country because the athletes or individuals involved must master the skills fully not only in terms of theory but also they need to master the skills practically.

## Methods

In this study, triangulation of data through observation, interviews and skill test had been used to identify the student's performance in the practical test using this software. The researcher chose the post-test only because this design is often used in the field of study involving psychology, education and human behaviour, where respondents control their own behaviour without involving other individuals or groups. According to Yin (2009), the strength of this design is the involvement of various materials allows the findings obtained to be manipulated. The researcher used the post-test and without involving other control groups because the researcher expects the respondents to be difficult to control and in the preliminary survey conducted by the researcher shown that the respondents not have the experience and knowledge through the required skills. Thus, the researcher assumes that there is no interference from other factors.

### Practical Skills Test

This test focused on practical test as to evaluate the progress of student's performance. The method used in this test taken place in the field which it can be suited according to the sports used in every subject provided. After the test, rubric was developed, and this rubric had been assessed by lecturers of the subject to validate the test as the instrument of this research. Six practical tests chosen in this research and it had been divided into three constructions; two tests for basic movement, two tests for random movement and two tests for specific movement.

### Observations on Students

Based on observations of student achievement in practical skill tests, 10 statements of question items for the developed checklist had been assigned. Two observers had been appointed to assist while conducting the the assessment during the observation of this practical test. The observation based on the video recordings collected during student's practical skill learning. Examples of some items included in the checklist are as follows:

1. Ability to perform and master the movement smoothly
2. Demonstrate improvement in mastering the movement learned
3. Produce movement with perfect technique
4. Demonstrate confidence and commitment while mastering or executing a skill.

### Student's Interview

For the student achievement in the practical test, interviews were conducted with two observers nominated by the researcher. In this semi-structured interview, the researcher asked 10 questions related to the study. Face to face interviews were conducted with both researchers and researchers. The interview session took half of the day and the resulting discussions were recorded immediately to draw conclusions about the findings. Examples of these interview questions are as follows:

1. Can students perform and master the movement efficiently?
2. Can students show improvement mastering the movement they have learned?

## Data Analysis

Researchers use quantitative data through practical skills testing and observational data as support. In addition, the researcher also used qualitative data when conducting interviews. To analyze the questions through for observations, practical skills tests and interviews, the researcher conducted them with two assigned observers who had experience in assessing student achievement. It involved 9 respondents comprising 4 male respondents and 5 female respondents. Student selection was based on active, medium active and less active categories consisting of 3 respondents.

## Result of Practical Skill Test

The results obtained from overall of the student's practical skill test shown the highest and lowest scores were 10.00 and 6.5. The student skill test analysis also had shown very high mean values of test 1: 9.46, test 2: 9.52, test 3: 9.78, test 4: 9.60, test 5: 9.45 and test 6: 9.28. Through this mean, it can be concluded that the students achieved high and satisfactory performance after using the software. This is because, for each construct, the mean values for all three constructs were 9.49, 9.69 and 9.37 with the overall mean being 9.51.

**Table 1.** Mean for practical skill test according to the construct

| Construct | Mean | SD |
|---|---|---|
| Basic movement | 9.49 | 0.05 |
| General movement | 9.69 | 0.29 |
| Specific movement | 9.37 | 0.06 |
| **Overall Mean** | **9.51** | **0.13** |

## Observational Results of Student

Data from student achievement observations were analyzed based on 10 items of statement questions. The data for each item is obtained by observing values from observers 1, 2 and 3 before divided into 3 to obtain the mean value. The scale used is divided into 5 sections whereis the part 1 represents "strongly disagree" statements while scale 5 represents "strongly agree" statements. Table 2 shows the mean and standard deviation of each observation item for student achievement.

**Table 2.** Mean observational achievement of student

| Item | Statement | Mean | SD |
|---|---|---|---|
| 4 | Demonstrated confidence and commitment to mastering or executing a skill | 4.56 | 0.53 |
| 2 | Demonstrated improvement in mastering movements learned | 4.44 | 0.73 |
| 1 | Can perform and master movement efficiently. | 4.33 | 0.50 |
| 8 | Clearly identify the action or action to take | 4.22 | 0.67 |
| 9 | Demonstrate skill and apply rules and regulations during real situations | 4.22 | 0.44 |
| 10 | Mastering and design the right formation during real situation | 4.11 | 0.78 |
| 5 | Ability to adapt or estimate skills according to their own ability | 4.00 | 0.71 |
| 6 | Repeating skills until mastering the perfect technique | 4.00 | 0.71 |
| 3 | Producing movement with perfect technique. | 3.67 | 0.50 |
| 7 | Ability to make or execute high volume movement in an evaluation | 3.56 | 0.53 |
| | **Overall Mean** | **4.11** | **0.66** |

*N = 9 students; SD = Standard deviation

The analysis results from the observation of the achievement of these students' skills indicated that items 1, 2, 4, 5, 6, 8, 9 and 10 are on the agreed scale. Whereas items 3 and 7 are at a moderate level. Overall, the results of the

observational analysis indicate the level of agreement for students' achievement in practical tests after using the software.

## Results from Interview

Researchers also use qualitative data in addition for the quantitative data through the interviews with observers for student achievement in practical tests after using the software. The two observers were made up of two trained coaches with certificates in sports coaching while the third observer consisting is the researcher itself. The interviews consisted semi-structured questions and were based on the same constructions as the questionnaire. To analyze the views on student achievement, the researcher prepared 10 interview questions. Examples of analysis and theme answers to the interview questions provided are:

Question 1: Can students perform and master movement efficiently?

For the first question, the researcher analyzed the results of this interview and the responses were divided into five themes:

**Table 3.** Theme for interview of student's achievement

| No | Theme | Example of Response |
|---|---|---|
| 1. | Ability to master the movement easily, efficiently and smoothy<br><br>N=5<br>Students 1,2,4,5,6 | **OB 1:** Student able to control the movement smooth and<br>**OB 3:** The way they execute all the movements were accordingly and following the phases of the movement. Plus, the student able to practice the skill confidently. |
| 2. | Requires more training<br><br>N=4<br>Students 2,4,5,8 | **OB 1:** Student need to do more training for them to master the skills efficiently. Students also can improve their skill with repeated exercises |
| 3. | Regular movement and phases<br><br>N=3<br>Students 1,2,5 | **OB 3:** The way they execute the movement is in order and according to the phases of the movement. They also have accurate position. |
| 4 | Confident with their skills<br><br>N=2<br>Students 1,2 | **OB 1:** These students able to practice their skills confidently while standing in their original post and execute the skills |
| 5 | The movement is not smooth<br><br>N=1<br>Student 8 | **OB 1:** Student still require more training to master the skills as the movement is still less smooth. The student also required to gain more understanding regarding the skills they want to master. |

OB – Observer | S – Students

From the analysis result it showed that overall, the viewer believes that students can perform and master movement neatly. However, observers mentioned about a student who exhibits poor movement.

## Discussions

The second research question is about student achievement in software testing after involving data analysis from observations, interviews and student test scores. Based on Table 5.8, it can be interpreted that from the observation, the overall improvement of student achievement is at the level of agreement for 8 observation items. While the results showed a moderate agreement for 2 observation items, which were items 3 and 7 though it approaches the value of 4.00, reaching to the level of agreement. Based on the findings from this observer, the researcher argued that students can still improve their achievement through more difficult assessments with repeated training. This is supported by the opinion of Weiyun Chen, Weimo Zhu, Steve Mason, Austin Hammond-Bennet and Andrew Colombo-Dougovito (2016), who argued that learning movement skills should be learned and trained in stages and repetitively so it can improve movement efficiency.

This is supported by the findings from the formulation of the themes in the interviews conducted as according to the observer, students are capable to perform and master the movement well. From the themes designed it showed that students are capable of mastering movement easily, neatly and smoothly, students need more practice and repetition, students demonstrate orderly movement and are in phase and confident in their skills. However, there are also students who show less movements and this is because students still need more training in skills and understanding to do skills need to be increased. According to Chen W, Mason S, Staniszewski C, Upton A, and Valley M (2012), students need to be given appropriate training or learning assignments and it will motivate the students into active participation. Proper assignments play an important role in ensuring students to have a successful experience (Weiyun Chen et al., 2016).

Besides that, most students showed improvement while mastering the movement they learned. The themes created showed improvement and the movement seems sharper. This can be seen in the statement from observer 1 to student 2 which was “During the second observation, the movement appears to be faster and is able to create ready posture to prepare for the skill”. However, there are students who show less mastery of the movement because from the view of the researcher, the student had no experience in the movement of skills. This is supported by the statement from observer 2 to student 8 “Movement is less but overall this student can show improvement and repeated training can improve this student's movement mastery”. This statement shows that students are not experienced at the beginning of learning but are able to produce movement after learning with the help of the software repetitively.

The results also showed that students were able to execute movement using perfect technique. The themes obtained indicate that students execute impressive movement, using the right techniques and have the chance to improve their movement. However, there were few students who are still lacking in skills and movement. Besides that, student’s achievement showed positive results because of the students showing their confidence and earnest effort to master or execute a skill. This is supported by few themes which were demonstrating that the sudent being confident, diligent and dedicated to master and practice their skills, showing students a positive attitude to learning and to develop the skills learned.

Next, the results of the interviews showed the student’s capability to adapt or evaluate skills according to their own ability. Students are capable of adapting, estimating and practicing skills and developing their own skills. The findings also proved that students practice repeatedly to hone their skills or technique until they master the skills itself and students also are capable making or applying high value movements during given assessment. Plus, the student can clearly identify the step or action to be taken before they able to demonstrate the skill while applying the laws and regulations in the actual situation. The researcher also suggested that students are capable in mastering and planning appropriate formations during real situations.

The findings from the practical test scores also supported the findings and interviews for this research question. According to Table 5.7, the overall scores on the students' practical skills test discovered that the highest and lowest scores of students were 10.00 and 6.5. Therefore, the results of the analysis showed that the students achieved high and satisfactory performance test after using the software.

There were several similarities discovered by the researcher, obtained from observations, interview and scores from students’ practical skill tests showing that there is indeed an improvement in student achievement after they have been through several iteration in the production of skill movement. It can be concluded that student achievement showed

improvement after they learn through this software. Besides that, this result had been supported by few studies from Chen W, Hypnar AJ, Mason SA, Zalmout S, and Hammond-Bennett A (2014) and Erwin H, Beighle A, Carson R, and Castelli DM (2013) suggesting that a group of students, with or without experience and knowledge about movement of skills can master the skills with the help from appropriate teaching method. Subliminally, teaching practice like the usage of software able to provide the students with maximum learning experience and creating productive learning environment.

## Conclusion

This study aims to look at the impact of using multimedia software integrating video analysis technology and simulation on the achievement and mastery of student skills movement. Overall, the student achievement in software testing after using the software is answered through observation, interviews and student test scores. The results of this triangulation analysis proven that the student's achievement high in the production of skills movement and it was an exciting development for every student. This positive result was obtained through analysis from observers who expressed their views through observations and interviews as supporting data. In addition, this positive achievement also reflected that the results of the students' practical skills test scores where there are students with full marks for the practice test of 10 points and only one student with the lowest score which scores up to 6.5 marks. However, this score is still at a satisfactory level. This proves that students can learn using this software to help them improve their skills.

## Limitations and Future Studies

This study involves many factors, however with limited time and ability, researchers limit this study according to the scope listed as follows:

1. The software is developed based on Sports Science subjects involving skill movement.
2. The software is developed based on the problem in learning movement skills in the subject of Sports Science.
3. The learning and evaluation process in this software is more focused on the movement of students' practical skills.

## Acknowledgment

This study was conducted using the Research University Grant (Q.J130000.2653.16J92) of Universiti Teknologi Malaysia (UTM), Malaysia.

## References

Abang Ismail Abang Haji Julhi, Mohd Taib Harun. (2007). Keberkesanan Penggunaan Multimedia Terhadap Penguasaan Kemahiran Sukan Bola Baling. Penyelidikan Pendidikan Institut Perguruan Batu Lintang.

Adjah Naqkiah Mazlan, Jamalludin Harun dan Zainal Abidin Zainuddin. (2012). Review on the Effectiveness of the Technology Learning Materials in Teaching and Learning in Higher Education. Proceedings of International Conference on Economics Marketing and Management, Singapore, Vol. 37, 174 – 178.

Boon, T. C., & Leng, G. R. K. (2005). Personalization Issues in E-Learning. WSEAS Transactions on Information Science and Applications, 2(10), 1514-1522.

Chen W, Hypnar AJ, Mason SA, Zalmout S, and Hammond-Bennett A. (2014). Students' Daily Physical Activity Behaviors: The Role Of Quality Physical Education In A Comprehensive School Physical Activity Program. J Teach Phys Educ, 33: 592–610.

Chen W, Mason S, Staniszewski C, Upton A, and Valley M. (2012). Assessing the quality of teachers' instructional practices. Educ Assess Eva Account, 24: 25–41.

Collinson, E. (2000). A Survey of Elementary Students' Learning Style Preferences and Academic Success. Contemporary Education (71) : 42-47.

Erwin H, Beighle A, Carson R, and Castelli DM. (2013). Comprehensive school-based physical activity promotion: a review. Quest. ;65: 412–28.

Julismah Jani, Ong Kuan Boon, Mohd Sani Madon, Hishamuddin Ahmad, Nur Haziyanti Mohamad Khalid, Yusof ahmad. (2009). Pendekatan Pengajaran, Gaya Belajar dan Jenis Penilaian dalam Mata Pelajaran Sains Sukan di Sekolah Menengah. Jurnal Pendidikan Malaysia, 34 (2) 81-91.

Mohamad Bilal Ali. (2009). Sistem Penghasilan Bahan Pembelajaran Peribadi Berasaskan Kecerdasan Pelbagai Dalam Persekitaran Web. Unpublished Ph.D, Universiti Teknologi Malaysia, Skudai, Johor.

Mohamad Bilal Ali, Baharuddin Aris, & Mohd Salleh Abu. (2008). Personalized Learning Environment: Utilizing Individual Learning Preferences Based On Multiple Intelligence, Screen Design, And Learning Objects. Paper presented at the Cooperative Learning in Japan & the World.

Mohnsen, B. (2008). Using technology in physical education (6th ed.). Cerritos: Bonnie's Fitware.

Nan-Zhao, Z. (2006). Revisiting the Four "Pillars of Learning": Roles of the Pillars in the Reorientation and Reorganization of Curriculum, Seminar on the Management of Curriculum Change. Quezon City, Philippines.

Peter, J. F. (2009). Instructional Design for Advance Learners: Training Recognition Skills to Hasten Expertise. Education Tech Research Dev, 57 : 359-376.

Weiyun Chen, Weimo Zhu, Steve Mason, Austin Hammond-Bennet dan Andrew Colombo-Dougovito. (2016). Effectiveness of Quality Physical Education in Improving Student's Manipulative Skill Competency. Journal of Sport and Health Science, 5, 231 – 238.

Wong Cheui Keen. (2010). Kesan Penggunaan Perisian E-Sukan Terhadap Kemahiran Psikomotor Pelajar. Ijazah Sarjana Pendidikan (Teknologi Pendidikan). Universiti Teknologi Malaysia, Skudai, Johor.