Chapter II

Review of Related Literatures

2.1 Introduction

The success of research depends on the knowledge, thinking, interest and insight of the researcher. Review of related research allows the researcher to be acquainted with current knowledge in the field or area in which he is going to conduct his research. Literature enables the researcher to get familiarized with the existing frontiers. A critical, insightful and comprehensive review of research has many values for the researcher. Assessing physical skills in sports is a difficult task. It is often impossible to pinpoint the exact area that is wrong with a child’s technique. This can hinder the teachers ability to give the student adequate feedback which in turn, hinders the students improvement. As with any subject, and any skill, you want to see the students developed and with improved skills over the training sessions.

Researcher’s goal was to enhance students learning and performance in sports. I have identified improvement of sports specific skills as the area of focus and to use technology to achieve the goal. In this research I would like to implement the use of video graphic teaching aid for skill learning. Researcher read a number of articles that discuss the value of video feedback on improving performance in physical education and other disciplines. Physical education is an area which needs a lot of visual feedback to takes place (Kibble and Cayley, 2003). This is important
because of the physical requirement performing skill. There is a need for modeling of correct skill so that the students learn correct technique. I was looking to see if video feedback is recommended by other researchers. Because of this technology now enabling coaches and teachers to video students and give them immediate visual feedback.

Some of the Related Research areas are:

- Impact of video feedback on learning
- Use of knowledge test for development
- Reviews on skill performance assessment
- Reviews on observation skills
- Reviews on teaching methods
- Video as instructional tool
- Use of video for analysis and assessment
- Reviews on video modelling with video feedback.

2.2 Impact of Video Feedback on Learning

Research related to Video analysis feedback and how it can assist physical education

I will summarize eight articles in chronological order and synthesize their findings using common themes.

Van Vuuren-Cassar and Lamprianou (2006) used quantitative methods to investigate the impact of written and video-based assessments on three teaching environments. Their study reinforces Ignico’s (1997) previous work that suggests greater knowledge is achieved with video and teacher
feedback. However, they contradict themselves in their article, by stating that students are ill prepared to receive video-based feedback and mostly dependent on teacher feedback.

In their article, Thomas and Stratton, (2006) investigate the equipment used, the training received, the attitude towards, and the teaching approach taken when using ICT in Physical Education in the United Kingdom. Their findings are based on surveys distributed across the country. Data was collected through quantitative means, but out of 500 schools given a survey, only 252 were returned, not enough to paint an accurate picture.

Fiorentino, L.H. & Castelli, D. (2005) this article describes a totally different aspect of incorporating videotape feedback (VTFB) technology into the classroom learning environment. Through the use of pre-shot video of common sporting venues and common situations of sports (i.e. caught in a run-down between home and third base), students immerse themselves into a virtual world of activity. Images and videos are projected onto a screen or wall and the participants position themselves on the screen and react to a game-like situation. Six different sports, from soccer to wheelchair basketball, were utilized to help facilitate the learning of desired behaviour's. The implementation of technology in today’s classroom motivates students, creates virtual situations for assessment of student learning, and helps teachers monitor progress towards a learned or set of learned motor skills. Overall, I think this article is a remarkable representation of how VTFB can be implemented as a substitute for real-
time environmental learning arenas such as a ball diamond or volleyball court.

**Newell (2002)** discusses the advantages of video analysis and feedback in professional and college level sports. He suggests that the sports world is changing and video analysis is becoming a permanent fixture for those wishing to obtain a higher level of success in athletics. His information is stated without references or citations and does not offer any research to support his claims.

**DG Liebermann, L Katz, MD Hughes, RM Bartlett, J McClements, IM Franks (2002)** presented a paper, which overviews the diverse information technologies that are used to provide athletes with relevant feedback. Examples taken from various sports are used to illustrate selected applications of technology-based feedback. Several feedback systems are discussed, including vision, audition and proprioception. Each technology described here is based on the assumption that feedback would eventually enhance skill acquisition and sport performance and, as such, its usefulness to athletes and coaches in training is critically evaluated.

**Bolt (2000)** explores the use video analysis for the purpose of attaining qualitative data. This article provides technological tips that apply to the use of video camera and computers for the purpose of improving students’ level of skill and performance. Although interesting and applicable, this article is an opinion piece that lacks research to support his claims.

**Darden’s (1999)** article examines the use of video feedback and its effectiveness in four multiple stages. Darden (1999) builds on Jambor and
Weekes’ (1995) work on video Feedback and cites them on multiple occasions. He reports that students will progress through a series of stages before video feedback becomes an effective tool. This article is from periodical targeting PE teachers. Useful recommendations for the use of video feedback are provided in their article, but lack credible evidence to support his claims.

Williams and Tannehill (1999) used qualitative methods in their research, to investigate the effectiveness of a multimedia performance teacher-training program, which analyses and diagnose throw-like movements. The researchers studied student teachers’ ability to recognize correct and incorrect throwing techniques. The researchers admit that their methods and procedure were flawed and further research was required to substantiate their findings.

Ignico’s (1997) study, examines the effects of interactive videotape instruction on under graduate student’s knowledge, performance, and assessment of eight sport skills. Ignico uses an experimental approach, which resulted in findings that suggest videotape instruction is more effective than teacher-directed instruction for developing performance and assessment skills. The participants in this research are university learners with a background in athletics and such results may not be applicable to high school Students.

Jambor and Weekes’ (1995) article is a how-to article on making videotape feedback more effective for teachers and students. They illustrate positive and negative aspects of the use of videotape feedback
and provide advice for making it more effective. The authors express ideas that may help students become better critical thinkers by asking leading questions that may assist students in discovery learning while observing their own performance. The target audience is physical educators. A concern of this article is credibility due to unstated credentials and personal biases.

2.3 Reflecting on video feedback as a tool for learning skilled movement

T. Cassidy, S. Stanley, R. Bartlett (2006) the software developer of siliconCOACH, a computerized two dimensional video analysis tool for coaches, was assisted in reflection of how his software provided coaches with learning opportunities to understand how coaches and athletes use performance feedback. Our understanding of reflection was informed by the work of Van Manen (1977) and Zeichner& Liston (1987). To assist in the reflection process, literature associated with feedback, physical education, and information & communication technology (ICT) was drawn upon. The ICT literature informed the technical reflection and had specific relevance for software development. The motor control and physical education literature informed the practical reflection and had relevance for any future development of support material to assist coaches in providing feedback to athletes. These reflections will be of interest to those coaches and sports scientists who are interested in gaining further insight into the interface between technology and coaching practice. Teaching proper lift
techniques: The benefits of supplementing verbal feedback with video playback

Romack J. L., Valantine A. D. (2005) providing verbal feedback to an athlete during strength training is one of the most important responsibilities of a strength coach. Feedback from an external source helps the athlete identify and correct performance errors and improves motivation. It is well documented that video feedback enhances the speed at which an athlete acquires a skill, compared with other teaching techniques such as live demonstrations or observation of the performer followed by verbal feedback. This article discusses how video feedback can be effectively incorporated into a training protocol.

http://www.nsca-lift.org/

Farrow, Damian; Chivers, Paula; Hardingham, Carl; Sachse, Shane (1998) Investigated whether video-based perceptual training would improve beginning tennis players’ return of serve via an interactive video simulation. 24 novice tennis players were randomly assigned with consideration given to the constraint of gender, to video-based perceptual training group, a placebo training group or a control group. Eight training sessions of 15 min duration were conducted over a 4 week training period between the pre and post testing. The participant’s decision-making time(s) and directional accuracy (movement direction) were measured. The results of an analysis of covariance (ANCOVA) revealed that the perceptual training groups were significantly faster than the placebo and control groups at deciding upon an appropriate response. There was no significant difference between the
training groups with respect to directional accuracy. These results are discussed in relation to possible advantages of perceptual training and methodological considerations for future perceptual training research. (PsycINFO Database Record (c) 2010 APA, all rights reserved)

H. H. Emmena, L. G. Wesselinga, R. J. Bootsmaa, H. T. A. Whitinga & P. C. W. van Wieringena (1995) This project is addressed to the effectiveness of video mediated instruction on the learning of the tennis service by novices. The research was carried out in an indoor tennis hall under normal training conditions. Three experimental groups were used: a video-model (VMT), a video-feedback (VFT) and a group with a combination of video modeling and video feedback (VMFT). Two control groups - based on different training periods - were also used: a traditional training group (TT1) which practiced for a period of 45 min per training session and a second traditional training group (TT2) which practiced for a period of only 30 min per training session. All subjects took part in five successive training sessions. No clear advantages of using video mediated instruction methods in teaching novices the tennis service could be demonstrated. Five sessions of 30 min practical training were shown to be as effective as five sessions of 45 min practical training in producing improvements in both form and achievement scores of novice tennis players. While, in the early stages, form and achievement scores were not shown to be significantly related, after five sessions a significant correlation (P<0.05) was shown.
2.4 Use of knowledge test for development

One of the main objectives of this research project is to assess participant’s knowledge and understanding of the various aspect of physical activity. To determine whether these objectives were being met, it is necessary to make measurements in the cognitive domain. The most efficient method of measuring the level of achievement of cognitive objectives is the written test.

In some disciplines there are nationally standardized test and norms available. In physical education, however, outside sources of written tests are rare. This is partly due to the great variety of activities embedded in physical education curricula and the fact that there are fewer textbooks available in physical education than in such classroom subjects as mathematics sciences etc.

In connection with the teaching of each activity in physical education program, not only should instruction and practice in the various skills be included, but also certain type of information should be provided. For each activity, appropriate knowledge may include the rules governing the activity, an understanding of the skill techniques required, the strategies involved for effective participation, safety measures etc.

Objective knowledge tests have at least three important purposes in physical education.

- To discover the pupils level of knowledge at the beginning of a course of instruction.
• To determine the degree to which pupils have grasped the subject matter presented.

• To motivate learner.

When using physical education knowledge tests, the importance of their construction should be considered. The rules of many sports are being changed constantly by their governing bodies; thus, rules in such sports included in knowledge tests prepared some years may no longer be correct. Similarly strategies may changes, techniques may improve, understanding of the activities may be enhanced through research, and, the history of the sports is on-going. Such developments would obviously not be reflected in the older knowledge tests. Therefore, researcher decided to develop the Basketball fundamentals skills knowledge test.

Before developing the test for this study, researcher has reviewed on knowledge test.

A comprehensive review related to the knowledge test in the physical education was reported by the Clarke & Clarke (1987) in his book. Hooks constructed multiple choice knowledge tests for college men in badminton, softball, tennis and volleyball. Preliminary tests items were derived from text and reference book, statements and personal experience. Advice of the experts in each sport in relation to subject matter content, test construction technicalities, and editorial quality was taken. Each test was then administered to 185 college men. As a result of item analysis based on this testing, each final test contained fifty items. Reliability coefficient, as determined by the odd-even method corrected for full test length by
Spearman-Brown prophecy formula were 0.88 for badminton, 0.89 for softball, 0.86 for tennis, and 0.95 for volleyball. National percentile norms were obtained from testing freshmen and sophomore men in eighty-nine colleges and universities throughout the United States.

**Baumgartner and Johnson** (1982) stated that, “Another person’s test not only may omit important material and include irrelevant material, but also may confuse students with the use of unfamiliar terminology.” Therefore, the investigator developed knowledge test on basketball fundamental skills, which will suit to the need of the students.

**Pake (1972)** in his study constructed a test called foundation of movement test for sixth grade children. This test included mechanical principals of movement, action of body joints, muscle action, locomotors movement and basic catching movement to which pupil were exposed during their primary and intermediate grades. The procedures followed in developing these tests were as follows:

- A total of 180 multiple choice tests items was assembled from appropriate authoritative texts on the subjects.
- A pilot study was conducted with pupils from public and campus schools.
- A revised test was administered to sixth grade pupils in another school regarded as having a well-developed elementary school physical education program.
• Statistical computations consisted of difficulty indices, discrimination analysis, and the Kuder Richardson formula.

• The final test items selected had difficulty indices ranging between 0.10 to 0.90 and discrimination analysis of 0.20 and better.

• All test items were subjected to an analysis table for written tests established by the State University of Iowa.

The final test of seventy multiple-choice questions had a Kuder-Richardson reliability coefficient of 0.67.

A test of physical fitness knowledge was constructed by Mood (1971) to measure the physical fitness understanding of senior physical education major students. A pool of 184 multiple choice questions was formed on 60 physical fitness facts secured from current physical fitness literature and the opinion of 73 members of the research council of the American Association for Health, Physical Education, and recreation. These test items were administered to 1360 physical education major students enrolled in 35 collegiate institutions in the United States. As a result of item analysis based on these data, two parallel forms of the tests, each containing 60 questions, were developed. In order to determine validity and reliability of the test forms and to establish national norms for them, they were given to 4167 students enrolled in 150 colleges and Universities. Ten physical fitness content areas were included in the test as, current status and promotion, evaluation, kinesiological aspects, nutritional aspects,
Programs, relation to diseases, physiological aspects, psychological aspects, sociological aspects and miscellaneous concepts.

Walker (1965) constructed a general knowledge inventory test for a general foundation course in physical education for men and women at the University of Florida. From a review of the literature and college curriculum, six content areas were identified as physiology principles of exercise and movement, kinesiological and mechanical principles, sports knowledge, motor learning, safety and first aid and objectives of physical education. With the aid of qualified physical educations, a pool of 225 best-answer multiple-choice questions was developed. After refining these questions by utilization of a jury of five experts and following item analysis procedures two forms of the inventory test were proposed. Subsequent investigation, however, demonstrated that the two forms were not equivalent, as Form B was shown to be significantly more difficult.

Hewitt’s (1964) comprehensive tennis knowledge test was first represented in 1937; complete revisions of forms A & B were reported in 1964. During the interim 10,000 copies were used by tennis teachers. The revised forms consist of 50 questions each, covering fundamentals of the game, rules of tennis, playing situations history of tennis and equipment. By item analysis and by use of Holzingeri index of discrimination difficulty ratings were determined from the percentage of beginners, advanced and varsity groups passing each item. By using the Spearman Brown prophecy formula between the odd versus even item for both forms combined (one hundred questions), a correlation of 0.95 was obtained.
Cowell (1961) designed a fifty item multiple choice test to evaluate the general background of senior physical education students and their ability to recognize the operation of certain principles and generalizations from a number of disciplines from which physical education draws basic principles. It may also be used as one of several screening tests to indicate readiness for graduate study in physical education. The principles and generalizations are drawn from the areas of scientific method, philosophy of education, sociology, biology, growth and development, psychology, curriculum development, methods, physiology of activity, cultural anthropology, and evaluation. The construction of this test involved item analysis and index of discrimination. The subjects were 200 physical education undergraduate and master's degree candidates from seven universities. Separate scales were constructed for freshmen men and women combined and senior and graduate men & women combined.

From above reviews researcher found that there was big gap after 1972 in formulating knowledge test in the field of physical education. This chronological gap in the availability of knowledge test constructs may well constitute justification for the preparation of homemade/teacher made tests.

A major objective of teacher-made tests is to cover the material presented in class and in terminology with which the students are familiar. In supporting teacher-made tests

Gershan (1957) developed a knowledge test of apparatus gymnastics for college men in professional physical education. Curricular validity was obtained from a review of textbooks, courses of study, and periodic
literature dealing with gymnastics. A checklist from this analysis was submitted to nine qualified juries to obtain their estimates of the contribution of the subject matter to a course in apparatus gymnastics. The major areas included in this test are as, apparatus activations mechanical principles and caching hints, health and safety, nomenclature, learning and motivation competitions and exhibitions general education values, selection and care of equipment, and history.

An experimental test was administered to 586 college men in professional physical education at 21 colleges and universities. Item analysis data obtained from this administration resulted in a revised test of 100 items. National norms were established from the results of testing 940 professional students in 40 colleges and universities representing various sections of the United States.

Winn (1957) developed a soccer knowledge test for college men; two forms of true false and multiple-choice questions are available. Curricular validity was based on an analysis of eight tests of soccer and the current periodical literature on these sports; judgments of competent persons concerned with soccer were also utilized to determine the essential objectives to be realized in a soccer course and emphasis to be placed on each. Statistical validity was obtained by use of the Votaw formula applied to the upper and lower 27%. The reliability coefficient of split half method corrected by Spearman-Brown formula for all 100 questions was 0.94; this coefficient was 0.81 for each of the short forms A and B. The total test correlated around 0.90 with the short forms.
Hennis (1956) constructed multiple-choice test for use in the college women’s instructional program for badminton, basketball, bowling, field hockey, softball, tennis and volleyball. Preliminary to the construction of the tests, an analysis was made of textbooks and printed source material for each sport. Based largely on this analysis, check lists were prepared and sent to various types of colleges and universities throughout the United States, the item content for these tests was determined from the replies. An item analysis was made for each test at forty-four institutions. Reliability coefficients for the different tests range from 0.72 to 0.81. The revised form of the tests contains thirty-three to thirty-seven items. Questions on the following content area were included in the questionnaire: history of the sport, equipment, etiquette, skills and techniques, playing strategy, team tactics, and rules and scoring. Percentile norms for the tests were constructed based upon test results from a large number of women students at many colleges and universities.

Langston (1955) constructed and standardized a test to measure the volleyball knowledge of men majoring in physical education who have completed their course of instruction in this sport. The test is composed of one hundred statements, part I consist of seventy true-false questions, part II of thirty multiple-choice questions. The phases of volleyball tested are history, pass, setup, spike, net recovery, block, service, offensive strategy, defensive strategy, rules and officiating curricular validity was accomplished through analysis of published material followed by the judgment of competent volleyball instructors.
French (1953) constructed extensive knowledge tests for college women physical education majors in the following activities, badminton, basketball, body mechanics, canoeing, field hockey, folk dancing, golf, and rhythms, soccer, softball, stunts and tumbling, swimming, track & field, volleyball and recreational sports (aerial darts, bowling, deck tennis, handball, shuffleboard, table tennis, and tetherball). Two forms of the tests were presented, a long form and a short form. The reliabilities of the tests for the long form are from 0.70 to 0.88; for short form, they range from 0.62 to 0.88. Between twenty-one and twenty-six questions compose the various tests.

Miller (1953) tennis knowledge test is associated with her tennis skill test. This test is designed for use with college women who are majors in physical education. One hundred true, false, multiple, response and multiple choice questions compose this test, designed to sample the following type of information history, rules, equipment and facilities, techniques and strokes and tactics; tournaments, terminology, and etiquette. Curricular validity was established through analyses of textbooks. Statistical validity of the test was determined by use of the Votaw formula, using the highest-scoring and lowest-scoring, 27% of distribution of the score of 381 students. Reliability of the test is 0.90.

Fox (1953) constructed a beginning badminton knowledge test. The test consists of 106 questions of different types including multiple choices, true false, and identification. The questions test the student’s knowledge of strokes and techniques, rules and scoring, strategy and terminology. In
constructing the test, the usual procedures for obtaining curricular validity and item validity were followed. The reliability coefficient for the test is 0.90. **Kelly and Brown (1952)** constructed an objective written examination on field hockey, designed for use with women majoring in physical education who are prospective teachers, coaches, and umpires of field hockey. This test consists of eighty-eight multiple response questions design to test the following four major areas: rules, techniques, coaching procedures, and officiating. Validity of the test was established by item analysis; by comparisons of scores made by experts, major, service and lay group; and by correlation of the test scores with instructors ratings of the competences of major students to teach field hockey. The reliability coefficient of the test was found between 0.79 to 0.89.

**Broer and Miller (1950)** developed tennis knowledge test. Five test forms are used multiple choice, true-false, completion, matching and identification knowledge of the following phases of tennis are tested: position, timing, and footwork, fundamental and advance stroke, strategy and court position, history, events equipment and court marking, rules and scoring. Item validity was determined from the performance of the upper and lower thirds of the subjects on the total test.

In test constructed by **Phillips (1946)** the questions consist of multiple-choice and true-false types. Validity was based upon three criteria: questions were constructed from a table of specification developed from course outlines, texts, statements of objective, and opinions of fourteen experienced badminton teachers; indices of discrimination were computed;
and the votaw curve applied to upper and lower halves was used. Reliability of the test as determined by the Kuder-Richardson techniques is 0.92 when corrected for guessing. Percentile and 'T' scales are available for beginners and intermediates.

Schwartz (1937) presented a basketball knowledge test for high school girls validity was secured by submitting the test items to fifty-four experts for criticism and by trial of the test with fifty girls. The final test contains fifty true-false, fifteen completion, twenty multiple-choice and fifteen pictorial questions covering rules, team play, strategy fundamental techniques and positions of players with their duties. The pictorial part of the test consists of stick-men pictures and diagrams illustrating choices of possible plays or positions from which the current selections are to be indicated.

Snell (1936) at the University of Minnesota set up a comprehensive series of multiple-choice knowledge tests for college women covering hygiene and the following ten physical education activities; archery, baseball, basketball, fundamentals, golf, hockey, horseback riding, soccer, tennis, and volleyball. These tests under went three revisions. The number of questions in each of the activity areas was reduced from 70 to 45, and in hygiene from 180 to 85, by eliminating those found to be ambiguous and those answered either correctly or incorrectly by all those taking the examination. Expert's opinion was the criterion used to establish validity for each test. For each test, computing correlations between even-numbered and odd-numbered questions and correcting to full lengths by the Spearman-Brown prophecy
formula aimed reliability coefficients ranging from 0.51 for horseback riding to 0.92 for hockey.

Rodgers and Heath (1931) proposed a knowledge test of softball for fifth and sixth grade boys consisting of one hundred true-false statements on game rules and game manuals. The reliability coefficient for the test was 0.89, utilizing the method of correlation of split halves and corrected by Spearman-Brown formula.

2.5 Studies on the Skill Performance Assessment

Assessment is an attempt to gain knowledge of the learner’s competences. In particular, what competences did the teacher/coach bring to the learning and what competences have they acquired as a result of their teaching. Purpose of the assessment in research is mainly two fold. One is to aid the learner in their subsequent learning and second is to report on what they have already learned. The first use of assessment is sometimes called formative because it is meant to help from learner’s learning. The second is called summative because it sums up what each has achieved. Skill assessment was the need of this study. For this purpose reviews related to skill performance assessment was discussed in the following section.

Many experts described skill in different way. Guthrie writes, “The learned ability to bring about predetermined results with maximum certainty often with the minimum outlay of time or energy or both.” James and Dufek (1993) proposed seven steps for the observation of movement. The steps in their observational strategy are to classify the skills to be analyzed,
divide the movements into phases, observe several times in order to evaluate each phase critically and focus attention on four major areas. They call the first step, classifying the fundamental movement pattern or the mechanical objective that is the focus of the skill, important to planning observation. Knowing the number and location of phases of the movement may assist in planning observations to see the important events in each phase. The last two steps are the guidelines for planning observation by focusing attention on either phase of four different areas. They suggest that the plan for observation should first focus on the total body (the rhythm or continuity of the whole body). Next, focus on the pelvis and trunk (the center of gravity) and large muscles, which initiate most movements. The third focus is the base of support and how it changes, because it is often the source of balance and reaction forces that drive the movement. Fourth, the observer should focus on specific actions of the extremities. These movements are often fast and difficult to see, so they advocate focusing on joint actions rather than specific segments. This model starts with a gestalt and concludes with an organized system of observation advocated by other Gangstead and Beveridge (1984).

Knudson and Morrison states that there are five major areas those professionals should consider in developing a systematic observational strategy. They should plan to focus attention on critical features to aid in the analysis. They should exercise as much control over the observational situation as possible. They should plan the angle of view or vantage points from which to view the performance and the number of observations they
expect to need. Finally, they may need to include plans for extended observation.

**Barrett (1977)** identified three key tasks in the development of observational skill in physical education: analysis, planning and positioning. According to Barrett, three components are needed in planning an observational strategy, deciding what to observe, planning how to observe it and knowing what factors influences the ability to observe.

**Whiting (1975)** defines skill as:

The term skill refers to the level of proficiency on a specific task or limited group of tasks. It is an organized co-coordinated activity in relation to an object or a situation which involves a whole chain of sensory, central and motor mechanisms (p.62).

Assessing how good an athlete is executing the skill is one of the main objectives of this study. For judging the skill performance, observation of the movement of these athletes is very essential. Observation is the process of gathering, organizing and giving meaning to sensory information about human motor performances. A simple view of observation of human movement essentially involves two decisions: what to observe (focus) and how to observe (a plan to observe). Several scholars have proposed guidelines for skill observation in human movement. Observation is only one task within qualitative analysis, and several observational strategies are effective. Different plans of observation may even be needed to accommodate the perceptual differences among observers.
Radford (1985) writes:

Observation was seen as three independent sub processes: attention, template formation and motivation. Attention is the process of limiting sensory information and can be controlled from the top down or the bottom up. For example, viewing the overall action draws attention to tyrannous movements (bottom up processing), while top-down processing is a conscious decision to direct observation. Template formation (analogous to deciding on critical features and their acceptable ranges) is the cognitive, abstract, symbolic representation of model of human movements. Templates of human movement are multi-layered, shapeable and generalizable to many performances. A template is not an image of an ideal movement but a generalized paradigm that accommodates differences within a definable range. The last sub process, motivation is involved throughout the whole process because good observation requires, “persistence, effort, practice and the subsequent elaboration of movement template” (p.5).

2.6 Reviews on Observation skills

2.6.1 Focus of Observation

The first task of qualitative analysis outlined the critical features of the movement to be analyzed. These critical features and any other variables that may be related to the performer and the situation become focal points for the systematic observational strategy to follow. Barrett (1977) calls this idea of planning focuses of attention in observation as scanning strategy. A scanning strategy is a plan to define what to look for, when, and how long
to look. Planning for a gestalt or observing with an observational model can achieve the goal of a scanning strategy. The qualitative analysis literature has proposed four approaches in which observation can be organized i.e. phases of movement, balance, the most important features, and the path from general impressions to specific actions.

The most common scanning strategy in analysis may be to observe critical features within the normal order or phases of the movement (Gangstead and Beveridge, 1984, James and Dufek, 1993; Phillip and Wilkerson, 1990; Pinheiro, 1994). This observational strategy decreases the perceptual overload, by focusing attention on the three primary phases of most movements: preparation, execution and follow through. In this system the focus is primarily on knowledge of performance for various part of the body during three phases of the movement.

If this observation strategy is used without a gestalt, then a body component of interest is observed through the temporal phases of the movement. Any other body components are observed in a serial fashion. Descriptive phrases can be inserted in the observational model to help guide the analyst.

If an analyst uses a gestalt observational strategy, the Gangstead and Beveridge (1984) model will be use focusing on specific aspects of performance. In a gestalt analyst observes for an overall impression of the movement. If analyst suspects a problem in a particular part of the movement, observational model will help him find a specific weakness in performance.
2.6.2 Observation Based on Importance

Second type of organization of observational strategy is based on a ranking of the importance of the critical features identified earlier. This approach is favored in research by Morrison and Harrison (1985), Morrison and Reeve 1986, 1988, 1989, 1992 Morrison 1994. This approach evolved from an earlier study by Harrison (1973). Biomechanical models of qualitative analysis tend to emphasize this approach by selecting variables for analysis that are related to the goal or primary mechanical purpose of the movement.

2.6.3 Observation from General to Specific

Several authors suggested the approach to move from general to specific. Brown, 1982; Hay & Reid, 1982; James & Difek, 1993; McPherson, 1990, Radford (1989) called this approach as bottom up attention processing. This approach is also similar to the gestalt approach, in which the analyst consider all the parts of the movement and develops an overall impression of the quality of the movement. The whole complete skill is greater than the sum of its parts. If the analyst feels that there is something wrong in the skill, he can pinpoint the deficiencies by looking at the phases of the movement or individual body parts or a combination of phases and body part.

Whatever the approach used to organize the observational strategy, some experts advocate written plans for observation. Examples may take the forms of checklists (Adrian & Cooper, 1989; Bayless,1981; Davis 1980;
Diagrams (McPherson, 1990), task sheets (Dunham 1986, 1994; Reeve
& Morrison, 1986; Morrison & Reeve, 1993; Klesius & Bowers 1990) or
rating scales (Hensley, 1983; Hensley, Morrow & East, 1990; Roseeath

In this research researcher has utilized observation by phases of
movement with rating scales.

2.6.4 Number of Observations

The analyst needs to plan the number of observations that should be
necessary to gather enough information for diagnosis and intervention.
Athlete need to repeat the movement because of the analyst’s perceptual
limitations and because the consistency of correct or incorrect technique
points is an important issues in diagnosis and intervention. Clark, Stamm
& Urquia (1979) found that the observation of six trials of a balancing task
for children was sufficient to provide a reliable relative estimate of
performance. There are few guidelines for planning the number of
observations needed for a qualitative analysis for a particular situation. It
can also vary between observers, depending on the complexity of the skill
and care of observation. Logon & Mckinney (1970) recommended
observing a minimum of eight trials, while Hay & Reid (1982) suggested 15
trials as a guideline. Based on qualitative analysis instruction studies by
Morrison & Harrison (1985), Morrison & Reeve (1989, 1992), some sport
skills requires only five repetitions for consistent qualitative analysis.
In Morison’s original videotape skill analysis test, the children performed each skill five times in sequence, and then that sequence was repeated. Reliability studies (Mosher and Schutz, 1983; Painter, 1990; Ulrich and Branta, 1988) also suggested that five observations are usually enough. Based on this discussion a reasonable rule of thumbs for the number of trials observed systematically in most qualitative analysis situation is between five and eight observations. Some simple and slow body actions can be reliably observed in one trial. It is also observed that in some events like, gymnastics, diving etc. sports officials and judges gives their judgments on the observation of a single trial.

2.7 Reviews on Teaching Methods

2.7.1 Teacher Directed and Others

Studies related to comparison of two or more teaching methods often use one teacher who teaches two or more classes using different methods, for each this design is intended to control for teaching ability. However its weakness is that it allows for the individual to bias the results, however unintentionally, due to the perceived efficacy of one method over other.

Guadagnoli, M., Holcomb, W. & Davis, M. (2002) this study compared three different learning styles for the golf swing: video feedback, verbal feedback, and self-instruction. All three methods of learning produce positive results at some point of another with most populations, but in the long run, videotape feedback was shown in the study to show the most improvement in overall golf swings. Initially, the study showed that self-
instruction showed the most immediate impact on performance. It is thought that this type of learning is less methodical and more spontaneous, whereas with verbal learning or videotape feedback, too much detail into each small mechanical insufficiency may make it difficult for one to focus in on one change at a time. As with any new learned technique, it takes time to become efficient and effective. Therefore, the results of this study show that in the long run, video feedback provided the greatest amount of improvement in the overall distance and accuracy of a golf swing.

To avoid this situation Thornson (1998) used two groups of university students participating in volleyball classes were taught by two different tenured faculties each of whom had over 25 years of teaching experience and had been recognized as excellent teachers as well as experts on volleyball. The two methods implemented by these teachers were traditional skill based approach and fitness fusion. In fitness fusion some basic drills and lead up games were modified to introduce more sport related movement than would occur in traditional approach. It was found that fitness fusion approach of teaching in sports oriented curriculum can be a successful way to improve volleyball skills.

Janelle, C.M., Barba, D.A., Frelich, S.G., Temmant, L.K. & Cauraugh, J.H. (1997) this article reviewed videotape feedback (VTFB) usage as voluntary versus forced and how both methods studied affected the overall learning process. Ultimately it was the group that was allowed to control their own learning pace and strategies that outperformed all others. In
second, the group receiving both verbal cues and VTBF performed much better than the other groups receiving no VTBF or verbal cues. Learning through self-controlled performance feedback seems to be most effective at learning new physical skills initially and also encourages the most retention of the skill in the long term.

**Gabride & Maxwell** (1995) studied direct & indirect method of squash instruction. Direct approach of teaching is the teaching in which the students are instructed as to the proper technique, proper usage, and even the strategy to be used in the given situation. The direct method implies that the skills must be learned before one can utilize them in a game context. In indirect method, instruction is structured to encourage student to actively solve the problems presented to them in a game situation by selecting and applying the appropriate skills and strategies. Results indicated that after six weeks of instruction both direct & indirect classes improved their skills and exhibited similar execution abilities but the indirect class showed a higher proficiency for making good decisions. It was also found that the indirect method students were more effective squash players based on shot selection. The indirect method allows the students to learn the strategic cognitive aspects of the activity along with the physical skill.

**Sohi & Adesoji** (1994) studied the effectiveness of whole and progressive part teaching method on learning of dribbling and straight hit in field hockey. The analysis showed that the use of both methods led to
significant learning of the skills and that both the methods were of similar effectiveness.

Griffin (1995) examined the relative effectiveness of tactical and skill based approaches (traditional) to teaching volleyball. The Intrinsic Motivation Inventory (IMI) tested 6th grade students for knowledge and skill together with assessment of motivation. Result of IMI indicated that there was more interest, enjoyment by subjects who were taught using a tactical approach. Knowledge assessment by the 18 item written test, indicated that the groups did not differ in terms of skill related knowledge at pre or post-test, but each group did show significant improvement in skill related knowledge. Both groups improved significantly in tactical knowledge, but post-test scores for the tactical group were significantly higher than the skill based group when adjusted for the pre-test scores. Results of skill tests indicated that neither group improved volleyball skills significantly over the duration of the unit. For game performance, analysis suggests that the tactical approach was effective, particularly in the areas of court position and decision-making.

Goldberger & Gerney (1986) studied the effects of direct teaching styles on motor skill acquisition of fifth grade children where they used style B, C, & E of direct teaching style from the spectrum of teaching styles described by Mosston, in 1981. Normally many researchers describe this style as traditional teaching styles. Following findings were stated in this study:
The four-way analysis of covariance with repeated measures revealed a significant main effect due to treatment.

On examining the effects of treatments by gender, no significant interaction was found. It was also noted that, in general, females appear to have done better.

When teaching children who demonstrate so-called exceptional aptitude for learning a particular motor task style E would be a good choice of style. Concurrently, style B, would be more appropriate for most average aptitude children in a class (p.219).

From the above results researcher concluded that the relative absence of the kind of individualized instruction provided by style E, in conjunction with the preponderance of style B-type teaching found in most schools, works, unfairly against groups of exceptional learners.

Johnson (1984) in their research to find the effect of co-operative, competitive and individualistic student interaction patterns on the achievement and attitudes of student’s learning the golf skill of putting concluded that males did better on putting than females on all three tests and there were no significant differences on the attitude survey between males & females in putting the golf ball. Subjects in the co-operative condition achieved marginally better scores on the twelve-hole course and significantly better on the thirty-foot test, than the subjects in the individualistic and competitive conditions. It is further concluded that subjects in the co-operative condition had a more positive attitude toward
the instructor than the subjects did in the competitive and individualistic conditions. The subjects in the co-operative condition felt that the instructor cared more about their feelings than the subjects did in the competitive and individualistic groups. Subjects in the co-operative condition also felt more positive about peers than the subjects did in the competitive and individualistic conditions. Co-operative subjects felt that other subjects cared more about their feelings, cared more about how much they learned and were more likely to enjoy helping them learn than the subjects in the other two conditions.

Anshel & Singer (1980) studied the effects of learner strategies with modular versus traditional instruction on motor skill learning and retentions. He used ANOVA and when the scores on the acquisition and retention tests were combined it was found that the groups using modular instruction performed constantly better than the group using traditional instruction, and strategies in comparison to no strategies.

Schlaadt (1969) in his experimental study compared team teaching & traditional teaching concluded that the team teaching methods are best suited for the students with superior mental ability.

Solley & Border (1965) compared student progress in the forehand drive when taught by the traditional method and when taught by the traditional method supplemented by use of the Ball Boy. Both groups were taught by demonstration, explanation, practice and individual corrections. Classes were taught for one hour’s 15 period’s duration. Following conclusions were arrived at as results of this study:
• Teaching machines which help in standardizing and controlling speed and direction of practice ball are highly valuable in teaching specific skill in beginning tennis classes, and in normal sized classes, such machines help significantly in achievement in their skills.

• If traditional techniques are to be rote with such techniques reinforced by use of machine such as the Ball Boy, it is more effective to emphasize traditional techniques first and then add practice with the Ball Boy (p.122).

2.7.2 Studies on other Teaching Methods

Abd Al-Salam Al-Naddaf (2004) The purpose of this study was to investigate and compare the effects of three teaching styles (command, practice, and self-check style) on university students' achievement of the long-high and short-low serves in badminton. Furthermore, it aimed at comparing the practice trials of the serve among the three groups. 42 male students, who were divided randomly into three groups, participated in this study. The results of this study indicated that the three teaching styles were significant in improving the performance level of subjects in the three groups. No significant differences among the three styles on performing the long-high serve were found. However, significant differences on performing the short-low serve were detected; students in the practice style were superior to students in the self-check style. Regarding the practice trials, students in the command and practice styles had significantly higher practice trials than students in the self-check style.
The purpose of the current study was to examine the effects of using two Mosston's teaching styles (practice and reciprocal) on basketball skills performance and attitudes of physical education students. The sample consisted of two separate groups of undergraduate physical education students from the Faculty of Physical Education at the University of Jordan: the practice group N=26 (17 females and 9 males) and the reciprocal group N=23 (15 females and 8 males). The participants enrolled in a required undergraduate course of basketball level (1) class during the first semester of 2002/2003. Independent T Test and (2 Way ANOVA) were used. The results of data analysis indicated that the practice group performed significantly higher than the reciprocal group in the jump shot and dribbling tests. However, the reciprocal groups scored significantly higher in the push pass for accuracy test. Additionally, the reciprocal group scored significantly higher level of attitude than the practice group in three of four attitude dimensions. The results also indicated that the female students in practice group performed significantly higher than the female students in reciprocal group in the jump shot and dribbling tests. However, the female in reciprocal group scored significantly higher in the push pass for accuracy test. Similar results were shown for the male groups.

**Turner (1999).** Used technique approach and the game for understanding approach to study effect on skill, knowledge and game play of field hockey. Each lesson in the technique approach typically began with a demonstration of the skill followed by allotted practice time. The skill was
practiced in drill situations. In games for understanding approach, each lesson in the games for understanding approach focused on teaching the tactical elements of game play. The results indicated that the games for understanding group exhibited better passing decision making than the other two groups and significantly higher declarative and procedural knowledge than the control group. The games for understanding group also demonstrated better control of the hockey ball and passed the ball more effectively than the other two groups during post-test game play. The technique group was significantly faster than the control group on the skill test.

**Sandy (1998)** studied the effect of practice style and reciprocal style. He studied the effects of three styles on skill performance and task analysis ability related to skill observation of third grade students (n=79). It was revealed from the data analysis that throwing form was significantly superior at the post and retention tests compared. In addition, a two-way analysis of variance with repeated measured revealed a statistically significant finding on the main effect for tests on task analysis ability. Post hoc analyses revealed that post and retention test were significantly superior to the pre-test on task analysis ability of the overhand throw. These two significantly findings related to throwing form and task analysis ability indicates that students were capable of improving overtime.

**Thomson, (1998)** studied traditional skill based approach and fitness infusion i.e. teaching with drill & lead up game approach on volleyball skill performance. A validated skill test, which utilized an alternating forearm
and overhead-passing format was used and administrated. Data analysis showed skill performance of the students in the fitness infusion classes equated those of the students in the skill-based classes. This kind of evidence would suggest that the fitness infusion approach to teaching in a sport-oriented curriculum can be a successful way to improve volleyball skills.

Another study which included skill teaching with lead up games and modified equipment and mastery learning and their effect on skill development, knowledge, self-efficacy and game play in volleyball approach by Harrison (1997) was carried out on 182 students in six intact beginning college volleyball classes. Data analysis revealed that no significant difference existed between skill teaching and mastery learning on the rate of learning for the forearm pass, serve, or spike on the rate of improvement in game play for the forearm pass or set on the rate of change in self-efficacy or on the knowledge test scores.

Breen (1984) used two different methods viz. command style & guided discovery style to see the effect on learning and retention of a juggling task. Fifth and sixth grade students from two public schools were randomly divided into two groups. Data were collected through a five trial pre-test prior to the second learning session, and a five trial retention test given one week after the final learning session. ANOVA indicated significant difference in both initial learning and rate of retention between the two groups in favoured of the guided discovery style. This indicated that the student centre style was better in novel task teaching.
2.8 Studies on Video as an Instructional Tool

Helmly, R.C. (1989) Advanced visual cue usage in 1 on 1 basketball was studied using an occluded film technique. Skilled and novice Ss viewed a series of randomly presented occluded film sequences of a pt guard performing 5 different 1 on 1 basketball moves. Their task was to determine which of the 5 moves was being performed. The results showed: (1) the skilled players were able to utilize more advanced visual cues than the novice Ss; (2) the skilled players were better able to utilize advanced visual cues during shorter viewing times than their novice counterparts; (3) the most utilized visual cues occurred between the time the ball came off the floor and touched the extended hand of the dribbler during the last dribble prior to the move and the time the basketball had moved 2 basketball widths away from the midline of the guard’s body towards its final destination; and (4) that ball flight is not needed to accurately determine a 1 on move. The specific advanced visual cues available and/or utilized were also identified.

Fleming, L. K. (1980) the purpose of this study was to compare learning in identifying tennis errors between 3 experimental groups using a videotape program of instruction and a control group. Learning was defined as gain scores between the pre and post-test. The groups were composed of PE majors from BYU who had some form of instruction in tennis. ANCOVA showed that the use of a videotape unit is effective in learning to identify performance errors and teaching cues in tennis, especially the serve. The results also showed that a videotape using experts to
demonstrate performance errors in tennis is more effective than a videotape of beginners performing the errors.

**Kamineneski, c. d. (1980)** 2 experimental groups and a control group were compared in the identification of movement errors for selected basketball skills. All groups were given pre and post criterion tests. The groups were composed of PE majors of Southern Missionary College. Between tests the exp groups viewed the instructional unit for skill error analysis using videotaped replay film developed for the study. Evaluation techniques included ANOVA. It was found that the video unit was effective in teaching error analysis; PE majors who did not view the unit could not make sig scores on criterion tests; there was no sig diff between groups in learning to analyze the dribble; there is no sig diff between mental and written practice in learning to perceive simple movement errors; and practiced learning is essential for competence the error analysis.

**Hudson, Jackie Lee (1974)** mutually exclusive groups of college women basketball players were filmed during performance of the 1-handed basketball free throw. The Ss were members of a beginning level basketball instructional activity class at Purdue University (N=9), members of the Purdue University women’s varsity basketball team (N=7), and members of the U.S. women’s basketball team for the 1973 World University Games (N=9). ANOVA procedures were used to determine if the groups exhibited differences in any of 10 biomechanical measurements or shooting accuracy. Stepwise regression methods were used to predict the shooter’s accuracy percentage and the likelihood of making a given shot.
Stepwise discriminant procedures were used to predict the group to which each S should belong.

**Mersereau, Michele Rae (1974)** Four female Ss were filmed at age 22 mo and age 25 mo. Data obtained from the film were used to calculate various biomechanical variables. A sub problem was to investigate the effect of general motor development, as measured by the Bayley Scale of Infant Motor development, on the development of running. Developmental trends were identified for kinetic energy values of the segments of the right lower extremity, the kinetic energy of the total body, the instantaneous horizontal component of velocity of the body center of gravity, stride length, the time in flight during 1 running stride, and the proportionate duration of time spent in flight during 1 running stride. Kinetic energy appeared as a particularly useful indicator of the developmental change in the running pattern of female infants at 22 and 25 mo of age. A slight relationship was found between running speed and general motor development as measured by the BSIMD.

**Griffiths, Anne M. A. (1970)** the drive and 5-iron shot of 10 college women were cinematographically studied to determine what specific movement patterns were necessary for the execution of a successful golf drive. Results obtained from selected measurements and tracings were compared among the Ss to identify the factors that appeared to be essential for a well-executed drive. Conclusions drawn were that the movement patterns were essentially the same for both clubs, and the golfer’s ability to control club head movement was an influential factor in
attaining lift and distance. Greater distances were attained by Ss who had a relatively greater amount of shoulder turn than hip turn on the backswing, a greater amount of wrist cock just prior to contact, and a more “upright” swing plane, while golfers who “topped” the ball had a tendency to life their arms in the hitting area.

**Zimmerman, Patricia A. (1970)** Women PE majors (N=4) enrolled in 2 badminton classes served as Ss. Both the control and experimental groups received the task method of instruction. However, in addition, members of the experimental group were able to view their own performance on videotape and the performance of experts on loop films. At the end of the instructional unit, selected badminton skills were measured by means of a battery of tests consisting of the French Short Serve test and the French Clear test. There were no significant differences between the means of the 2 groups for any of the skill tests. The task method of teaching with the addition of these visual aids was not superior to the task method without the visual aids.

**Reid, Dianne A. (1970)** Determined was whether there was a difference in volleyball serving ability at the end of a 5-wk. instructional period between a group of 31 college girls taught how to serve by means of a teaching method using the videotape recorder and another group of 25 girls taught the same skill by conventional means. Both groups were giving a Volleyball Power Serve Test as a pretest. All classes met for 1 hr., 3 days/wk., but Ss in the experimental class were taped during only 1 of these lessons. The plan for taping was as follows: the experimental class was divided into 3
groups, A, B, and C, A met on Saturdays for 3 wk. To be videotaped and was further divided in 4 groups of 3. Each group of 3 participated in a pre filming practice, a filming practice (6 serves), a viewing of (6 serves), a viewing of the tape of the filmed practice during which corrections were given by the investigator, and a post filming practice. Total time spent on the serve in 1 session for each girl was 15 min. The control class also spent 15 min/wk. practicing the serves in a similar rotation. A posttest indicated that although both groups improved significantly in serving ability there was no difference between the groups.

**Hosinski, John Philip (1966)** sixteen boys with basketball experience were divided into two groups. One group was taught 6 options of the shuffle offense in basketball with a traditional on-the-floor presentation. The other group was presented the same material by means of a programmed presentation on the IBM 7010/1440 Data Communications System. The group receiving the programmed presentation exhibited a better knowledge of the material on 4 written knowledge tests. This was significant at the .05 level. No significant differences were found in either group’s ability to perform the offense.

**Surburg, Paul R. (1966)** the subjects, 183 male junior college students, were divided into six experimental groups and a control group who were tested before and after an 8-week period with the Broer - Miller tennis test. Three groups received audio, visual, or audiovisual instruction three times a week and then practiced the forehand drive mentally. The other three experimental groups had the same instruction but did not practice mentally.
The mental practice groups all made significant gains and were superior to the other experimental groups. Audio-mental practice was superior to the other methods.

2.9 Studies on Use of video for analysis and assessment

Bothner, K. E. (1992) Video image processing has become a convenient and powerful tool to represent movement. The capability to interface a computer with a video source to perform motion analysis makes this technology ideal for fields such as biomechanics. A short turnaround time between filming and the accumulation of data makes video more efficient than cinematography, and the portability enables researchers to collect data in many diff settings. Video anal systems on the market today have two drawbacks, however. First, the cost of fully developed systems may deter some users. Second, the user has little or no input into the software development, making modifications of input parameters, image manipulation processes, and output formats impossible, in this study, a video-based motion anal system was developed with full documentation of each stage of the process, from hardware acquisition to algorithms implemented in the software. With this knowledge, accessibility to this technology will be increased, which should enhance and augment future research in the field.

Gautn, Sharon J. (1976) female (N=3) and male N=3) varsity basketball players were filmed performing a jump shot at the free throw line. Primary phases of the shot studied were preparation for the jump, flight, ball
release, and follow-through. Selected mechanical components of the jump shot were studied and compared among Ss of the same sex and between male and female groups. Time intervals of the phases and velocity and trajectory of the ball were calculated. Findings supported the following conclusions: performance of the jump shot varies among Ss of the same sex as well as between male and female shooters; although authorities recommend techniques which contribute to proper execution of the jump shot, these techniques are modified by various performers, thus there is a great deal of individuality in techniques used in execution of the jump shot.

Ercanbrack, Deanne, (1972) Stick figures were prepared from films using a Kodak Microfilm Reader and were analyzed to determine body positions and timing. Mathematical calculations determined velocities and trajectories of the jumps. Two Ss were filmed; I performed the front somersault and the other the back. The front somersault skier jumped 87 ft. at 52 ft/sec at an angle of 38° with the horizontal in 2.13 sec. The back somersault skier jumped 81 ft. at 55.9 ft/sec at an angle of 40° with the horizontal in 2.57 sec. A successful jump can be accomplished at 50 ft/sec on an incline of 30°. The skier has approximately 2 sec to complete the somersault. The circumduction of the arms in the direction of the somersault will slow or stop the motion and in the opposite direction will speed up the rotation. Beginning skiers should not attempt these stunts; more advanced skiers should do so only with professional instruction and proper hill and snow
conditions; and the skier should be experienced in diving and/or rebort tumbling.

**Blank, Anita M. (1971)** sixteen mm B/W film was used to photograph the clear stroke performance of 3 undergraduate women who participated in the 1971 DGWS National Intercollegiate Badminton Championship. Analysis of the Ss' movement revealed that although the gross motor patterns were similar, individual variations existed in the backswing motion, forward motion of the racket arm, and follow-through action.

**Hunter, Martha J. (1971)** two films, 1 of a 6-player and the other of a 5-player game, were analyzed. After determining the % of passes and shots at goal, no significant difference was found between the no. of times that the following passes (book, 1-hand bounce, 1-hand shoulder, 1-hand underhand and 2-hand bounce) and shots (hook, jump and overhead set) were used in either game. The 2-hand chest pass, 2-hand underhand pass and 1-hand set shot were used more frequently in the 6-player game, while the 2-hand overhead pass, the jump pass, the lay-up shot, and the 2-hand set shot were used more often in the 5-player game. X2 revealed no significant difference in the number of intercepts, dribbles, jump balls, rebounds, turnovers, violations, or fouls used in either game.

**2.10 Reviews on Video Modeling with Video Feedback**

**Ziegler (1994)** also evaluated the effects of video feedback during attention shift training on the execution of soccer skills. In this study, soccer players were trained to respond to different external stimuli (i.e., position of ball,
teammates, and opponents). A multiple baseline design across four male collegiate soccer players was used to examine the effectiveness of an attention training program on the execution of targeted soccer skills. Subjects were exposed to information and laboratory attention shift exercises followed by practice of accuracy of execution of different soccer activities. During the attention shift exercises, participants viewed videotapes of past games. The use of attention shift training with video feedback resulted in an improvement in execution of soccer skills. The study results also revealed increases in the number of points scored following the completion of the training intervention.

In 1993, Winfrey and Weeks studied the effects of self-modeling (videotape feedback) on a gymnast’s ability to estimate her beam routine score. Gymnasts between the ages of 8 and 13 participated in the study. The participant’s beam routine performances were videotaped and later scored by judges. Before each practice, the gymnast viewed the edited videotape of her own successful beam routine performance. Results indicated that following exposure to the self-modeling videotape intervention, gymnasts were more accurate at estimating their next beam scores. A limitation to the study may include the use of potentially subjective judge’s scores as a dependent variable. Future research may examine the use of checklists or some other method of more objectively measuring performance. Future studies could examine the effects on performance of viewing videotapes of expert athletes performing specific skills.
In (1990), Hazen conducted two experiments on the effects of videotaped feedback and modeling on racing turn performance of swimmers. The participants in these experiments were a group of 8-12 year old competitive swimmers. In experiment one, researchers calculated the percentage of correct freestyle flip turns and the percentage of correct backstroke turns. The intervention involved a videotaping package that included modeling, role-playing, symbolic modeling, instructions, videotaped feedback, and verbal feedback. If the swimmer was working on the back stroke spin, the coach instructed and modeled the correct position while lying on the pool deck. The swimmer then role played the turn on the pool deck. In addition to the modeling and role playing, the subjects watched a videotape of an expert perform the turn correctly (symbolic modeling) as an instructor verbally highlighted relevant components of the turn. In the pool, the swimmer then performed two turns and was immediately provided with self-video feedback on a color monitor. While the swimmer viewed his or her turns on the video tape, a trainer provided verbal positive feedback for the correct turn components and corrective feedback for incorrect turn components. Videotape feedback was provided within each session and training sessions continued until the swimmer reached a set criterion for the skill. Results from experiment one showed an increase in the percentage of correctly executed freestyle flip turns from baseline levels of 60-80% to intervention and maintenance levels of 80-100%. The percentage of correctly executed backstroke turns also increased following the intervention.
The second experiment conducted by Hazen (1990) monitored the percentage of correct freestyle stroke components following the intervention of reviewing self-video tape performance in a group and then individually. In baseline, participants were at near zero levels of present correct freestyle components. Following the intervention, participants' scored in the 60-100% range of correct freestyle components. Generalization sprint trials showed that participants who received individual review of their tapes had better time performances in comparison to participants who received only group videotape exposure. In the future, a component analysis of this intervention package would be useful to identify which of the components in the intervention package were actually responsible for the observed improvements.

Since the study by Hazen and colleagues in 1990, a handful of other studies have evaluated video modeling and video feedback to improve athletic performance in a variety of sports. Expert Video Modeling with Video Feedback to Enhance Gymnastics Skills Eva Boyer

In an effort to develop more efficient and practical interventions for athletic Performance, some behavioural researchers have incorporated a variety of technological innovations. In sports research, only a few studies have examined the effects of video feedback on athletic skill development. The effects of combining expert video modeling with self-video feedback as an adjunct to standard coaching techniques were analyzed in this study. Participants in this study were four 7-10 year old competitive gymnasts. During the intervention, each gymnast performed a specific gymnastics skill
and then viewed a pre-recorded video segment showing an expert gymnast performing the same skill. The gymnast then viewed a video replay of her own performance of the skill. Next she saw a side by side slow motion with freeze frame comparison of her performance with that of the expert model. Lastly, in normal time, the gymnast viewed the expert video clip again, followed by her own performance of the skill. The effect of expert video modeling with self-video feedback on gymnastics skill performance was evaluated in a multiple baseline across behaviors research design. The results showed that the gymnasts’ skills increased in performance following exposure to video feedback.

2.10.1 Video Modelling Strategies

In addition to the use of video to provide performance feedback on athletic performance, video has also been used to provide expert modeling (e.g., Hazen et al., 1990). In 2002, Boschker and Bakker investigated the effects of observing a video of an expert wall climbing, a novice wall climbing or just observing the wall on video. Undergraduate students were separated into the three conditions and measurements of percentage of a successful climb and duration of a climb were recorded. Participants who received a video performance of a model (novice or expert) had faster and more fluent climbs. The participants in the novice video condition demonstrated the greatest time reductions to climb the 7 meter wall. Unfortunately participants in each condition observed a different climbing technique. Future studies should use videotapes of expert and novice climbers performing the same wall climbing skills.
In 2002, Zetou, Tzetzis, Vernadakis, and Kioumourtzoglou examined the effects of expert modeling versus video feedback (called self-modeling) on volleyball skills. The subjects, children ages 11-12, watched a video of either an expert performing several volleyball skills (expert modeling group) or a video taken of them serving (self-modeling group). Participants in the expert modeling condition demonstrated more improvement in a variety of volleyball skills (set and serve score/form) than did the self-modeling group. However, the self-modeling participants’ serve scores were slightly higher than the expert modeling participant scores. This study had participants view the expert model tape in a large group, while self-model participants were able to view their tapes individually. Future research should attempt to control these types of extraneous variables or perhaps directly measure their effects on performance.

In one study, video modeling and video feedback were combined. In 2001, Harle and Vickers studied the effects of quiet eye training on university level basketball free-throw shooting. Participants received video feedback on their eye gaze. Participants reviewed their quiet eye (player’s final glaze on hoop area) data in comparison to a video of an expert’s eye gaze. Subjects were taught a three step routine (stance, hold, shoot) during a feedback session and later on the basketball court. Results demonstrated that training a sustained duration of gaze on the hoop prior to the execution of a shot can improve free throw performance.

In 1998 Scott, Scott, and Howe tested the effects of video modeling on adult tennis players’ ability to return tennis serves. Participants viewed a
film of a person serving and were asked to describe it verbally (type, depth and landing). Subjects were then requested to physically model the correct tennis stroke return. When a subject’s performance scores reached criterion (75% correct or 45 points out of 60) the participant progressed to the next session and the speed of the video was gradually increased. This intervention resulted in a measured increase of 10 points earned on court serves and returns compared to baseline scores. Although the study used only an AB design, the positive results of this study suggest that video modeling is a promising approach and should be further evaluated in additional sports performance research. A variety of other studies have evaluated video modeling for improving athletic performance.

2.11 Summary

Researcher has reviewed a number of articles, dissertations, Journals, abstracts etc. related to present research. From finding of most of the researches it is clear that use of technology enhances skill acquisition and sports performance. The review of related literature provided guidelines to the researcher to identify the need of the research, tools required and the methodology to be adopted for the research. Many of the articles stressed the need for visual feedback to enhance performance. “Performance improves faster with feedback than without it” (Gibbons, 2004, p38). There were also many suggestions on how to give verbal and kinesthetic feedback with the video feedback. Feedback should be specific and meaningful so that the learner knows exactly where he/she needs to improve (Gibbons, 2004). Give information promptly and relate it
directly to the error so students do not practice the wrong technique. Reinforce good technique so that the student will continue to work on repeating this skill. VFB offers an opportunity for students to analyze and break down the skill movement. The learner can interact with their own video (Jambor and Weekes, 1995) and can become more involved in their own self-assessment and learning (Kibble and Cayley, 2003). Students can spot their own errors and work on these. VFB also allows for teacher assessment and analysis. The teacher can isolate the incorrect parts of the skill so it is easier to work on. The teacher can assess a student's skill level as the VFB provides evidence of the student's learning and improvement (Kibble & Cayley, 2003). Another benefit of VFB is the motivational factor. Coaches have used VFB to not only break down the errors in technique, but also look at the cognitive processes that may affect an athlete while performing a skill (Darden, 1999; Jambor & Weekes, 1995). Although this is probably not as important in a PE class, it may highlight some of the nervousness and negative thinking that affects the skill particularly by lesser skilled students. Researches have shown that VFB increases the motivation to learn in lesser skilled athletes. Reinforcing good technique also encourages students to repeat correct technique and can be interpreted as a behaviorist style of instruction for VFB.

Another great advantage of using video is that it can become an instructional tool. In many PE classes, there is a large range of abilities. A teacher can set up a work space with videos of experts so that some of the students can analyze and work on the correct form while the teacher works
with others. This can help to give more individual attention in some cases and can make the class more efficient (Newell, 2002; Fiorentino & Castelli, 2005). Teachers should remember that the videos are only instructional tools and there is still a need for the teacher to facilitate the learning (Darden, 1999). An exciting part of reviewing this literature was that it has made me rethink the implementations that I used along with the video. I had considered that a “skills checklist” would be the most important implementation tool for my research. A major point I got from reading the articles is that VFB needs to be used in conjunction with verbal feedback. I do think that the amount of feedback I needed to give was less, but will still play a significant role in the student’s improvement. Boyce et al (1996) point out that teacher feedback is important when a student is initially learning a skill. The need for VFB comes after the student knows what the skill is and can use the VFB to identify errors in technique. It was important for me to facilitate rather than direct student learning (Jambor & Weekes, 1995). I came up with a series of questions that prompt students’ thinking when analyzing their own performance. VFB is useful because it allows the student to take responsibility for their own learning. My verbal feedback needs to be specific and meaningful (Gibbons, 2004). A student should learn faster with prompt and specific advice on where to improve their skills.

Knowledge-assessment instruments in Physical Education may include paper and pencil tests used to find out students’ knowledge of rules, positioning, or key parts of skills. Specifically, multiple-choice tests have
been used as an assessment tool for judging sport knowledge in many research studies (French & Thomas, 1987; French, Werner, Taylor, Hussey, & Jones, 1996; French, Werner, Rink, Taylor, & Hussey, 1996)

A comprehensive assessment of games player effectiveness requires the collection of skill, knowledge, and performance data. Griffin (2001) maintain that both cognitive and motor components are extremely important in developing sport performance expertise. In order to evaluate a player's level of game play, all components that define an effective games player must be considered. Traditional assessment instruments in Physical education includes cognitive paper and pencil knowledge tests. These tests determine players' knowledge of rules, positioning, or mechanics of skills. A skills test is another typical assessment.

Grehaigne, Godbout, & Bouthier (1997) indicate that the current assessment practices in team sports include standardized setups (outside of game context) and real-life situations, which produce both quantitative and qualitative data. The data are collected by standardized skills tests; Statistics derived from competition; and ratings of performance (the quality of form) in a standardized setup, or ratings of performance during the game. It can be concluded that assessment of any given player in team sports involves a complex system. The intervening elements are not only numerous, but also interactive. The rapport of strength (oppositional relationship between teams) varies in different situations or even within one situation.
Some studies indicate that VGT is a viable and effective supplement to physical education instruction. These studies revealed that computer-assisted tutorials were as effective as TI in teaching motor skills (Steffen and Hansen, 1987; Ross, 1994; Summers et al, 1999) and knowledge learning (Kerns, 1989; Guthrie and McPherson, 1992; Deere et al, 1995;)

A variety of other studies have evaluated video modeling for improving athletic performance. In 2002, Boschker and Bakker investigated the effects of observing a video of an expert wall climbing, a novice wall climbing or just observing the wall on video, Nicol and Anderson (1999).

In addition to the use of video to provide performance feedback on athletic Performance, video has also been used to provide expert modeling (e.g., Hazen et al.,1990). With video feedback and video modeling both established as effective procedures for enhancing athletic performance, some researchers have compared the effectiveness of the two procedures.

In 2002, Zetou, Tzetzis, Vernadakis, and Kioumourtzoglou examined the effects of expert modeling versus video feedback (called self-modeling) on volleyball skills.

Researcher reviewed related researches which were based on use of technology in various sports. Researcher did not found any research based on use of video graphic teaching aid in basketball skill learning. Researcher also found that very few studies based on video graphic teaching have been conducted especially in sports in India.
It is also been identified from the reviews that video graphic teaching aid is used at college level, but not for beginners so researcher planned to work on this area.

Findings of most of the researches show that video graphic teaching method is more effective than traditional method. In the same line researcher planned to work on comparing the two methods and also included video feedback along with video modeling.

In the present research, researcher has used video clips of experts, immediate video feedback along with traditional teaching for experimental group, knowledge test, standardized skill test, skill observation by experts.

Due to advancement of technology, it is the need of the time to use technology in sports too for the betterment of the students; hence the researcher felt the need to conduct the present study.
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