Development plan for the Mobile Soccer Academy coaches' support materials – Coaches' feedback and experiences with the benefits of the program and need for further development?

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Abstract

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The Mobile Soccer Academy (MSA) digital soccer resource (www.mobilesocceracademy.com) has been in service for eight years. The service is supported by a video library consisting of over one thousand videos on coaching, team practice, and self-directed training.

The objective of this project is to create a further development plan for the MSA supporting materials. The final product will be used by the coaching staff of the 8 to 9-year-old junior team of a Helsinki based soccer club Pallo-Pojat (PPJ). The goal of this project is to bring variety and ease to coaching, increase the quality of coaching, and save time in planning training sessions.

The method of this project was process analysis. Process analysis was a natural choice for this study because the objective of the project was to create new knowledge and understanding and to create change (Ojasalo et al., 2020, 59). The coaches of PPJ club and coaches from a few other clubs were actively engaged in this process analysis.

The steps of this development plan included a pilot study of the materials, a questionnaire, and interviews with the coaching staff. Additionally, the coaches were invited to a brainstorming workshop to reflect more deeply on the topics that emerged in earlier phases of the study. Based on the gathered data, the team created a plan for the further development of the coaching support materials. The development plan focuses on the recommendations that emerged in the questionnaire, interviews, and the brainstorming workshop.

The four most important tasks of the development plan include building two separate supporting materials, designing and updating the materials, creating new video content, and selecting key exercises. This development plan will be implemented throughout the summer and fall of 2022. The goal of this project is to have the final version of the service ready for use by the club by late fall 2022.

Key Words
Digitalization, learning, soccer coaching, skill, game IQ

Contents

1 Introduction

Soccer has been a major part of my life since I was a young boy. Following and to some degree during my own soccer career, I began to coach, and I knew quite early in life that in one way or another I wanted soccer to become my career. This is how I arrived at studying soccer. Coaching has developed incredibly over the years. The idea to design a digital coaching application for soccer came about based on my firsthand experiences and needs in this field. I had also noticed at various training scenarios that pictures of drills and exercises did not translate to coaches as intended. In fact, coaches were requesting these materials in video format.

In 2014, I developed the digital Mobile Soccer Academy (MSA) service (www.mobilesocceracademy.com). The purpose of this project is to write a plan for future improvements in the 2018 MSA digital PDF materials. The digital PDF materials allow for easy viewing of the MSA videos. The video library includes skill exercises, basic drills, and small game drills intended for coaching 8 to 9-year-old soccer players. The videos are grouped based on difficulty level from easiest to most challenging making it easy to find just the right exercises. The selected training exercises align with the recommendations of the Finnish Soccer Union (Suomen Pallo Liitto) and other coaching methods, such as Coerver, Ekkono, and Hors Wein, have also been considered in the design of MSA.

Soccer is the most popular sport in the world spanning all continents from Europe to Africa and Asia to the Americas (factoja.com). Soccer is also the only sport that can cause the population of an entire continent to hold their breath in suspension, while waiting on the results of a singular match. Half of the world's population, four billion people, followed the 2018 World Championship games (Afckeltik.com) and it is estimated that about 3.5 billion people in the world follow soccer regularly (TV-matsit.com, 2020). According to FIFA studies, 265 million people worldwide play soccer (Alavuotinki, 2017). Simplicity is one of the major draws to this sport that can be learned quickly even as a child (Factoja.com, 2022).

Soccer is by far the most played sport in Finland, and it is quickly growing in popularity. Football Association of Finland (Suomen Palloliitto) with almost 1000 clubs, functions as the governing body. Over 135,000 players are registered and about half a million players participate in the sport weekly (Palloliitto b, Palloliitto c). The Finnish national team has also experienced success in recent years. The men's national team won their division at the Nations League in 2021 and they made it to their first European Championships, played in St. Petersburg and Copenhagen, that same year. The women's national team also made it into the European Championships in the summer of 2022. Men's futsal national team also played their first European Championship in early 2022.

Many soccer clubs and teams have already utilized video materials in coaching. Some clubs have also produced their own materials. Additionally, for example YouTube has training videos available to everyone. However, the digitalization of an entire couching strategy takes time and resources. No club has accomplished this goal yet. In creating digital content, it is important to decide how to share it with coaches. Are coaches able to decide which exercises and drills are the right ones for the team they are working with? With a large library, the coaches may not be able to find the relevant content for their team and they may get overwhelmed with a sheer quantity of materials. Creating a single resource with videos grouped based on age groups will assist coaches in their daily work.

This research project will be conducted as a process analysis of the development project. The development plan will then be implemented to further improve the digital PDF materials that were a part of my 2014 digital coaching service, Mobile Soccer Academy. The digital PDF materials include age specific basic training and skills training video links. The objective is to update the old materials to enhance coaching and find new digital platforms and methods for coaching. I collected feedback from coaches through questionnaires, a brainstorming workshop, interviews, and through pilot testing. I am creating this plan for Pallo-Pojat ry, where I also work in coaching. By designing this digital platform, I hope to make planning, implementation, and organization of training easy for coaches. A variety of digital content can help further enhance coaching and team training and it can help save time. The updated version of the materials will be used in coaching the PPJ 8 to 9-year-old players. The goal is to digitize the team's key exercises and create an easy-to-use exercise library. In the future, our goal is to create similar libraries for coaching of other age groups.

2 Skill

Learning a skill means training to accomplish a change in movement patterns. In the learning situations neurological, cognitive, and emotional changes occur simultaneously in the student. Training results in learning that is the result of central nervous system learning process. Learning a skill is a permanent change that can be reactivated even after a long break in activity. Learning a skill results in permanent central nervous connections that allow the person to remember the skill. In learning a skill, the person refines the skill, standardizes the movement pattern, and then performs it in various training environments. The more refined the skill becomes the more uniform is the player's performance. However, the performance of a skill is never identical. (Hakkarainen, 2009, 237).

Transference is an integral part of learning a skill. Positive transference means that a prior skill makes learning a new skill easier. For example, tossing a ball over the shoulder has a positive effect on learning to throw a javelin. The central nervous system has developed connections and a model for throwing a ball, a movement very similar to throwing a javelin. A negative transference effect means that a previously learned skill makes learning a new skill more difficult. An example of a negative transference is the basic strike in tennis and badminton (Hämäläinen, 2015, 347-348). Figure 1a includes examples of positive and negative transferrence.

Positive Transference	Why?
Bandy and golf	The movement of clubs is similar
Skating and skiing	Both involve balancing on equipment
Gymnastics and pole jumping	Both demand control of the body
Floorball and hockey	Same time of game
Negative Transference	**Why?**
Long jump and triple jump	Direction of push is different
Gymnastic jump and power jump	The us of the ankle is active vs. passive
Tennis and squash	The movement of the racket is different – from bottom up vs. top down

Figure 1a. Proper training of children and youth (Hämäläinen, 2015, 348)

In his book, Antti Mero (2004, 241) introduces various types of skills. According to Mero, skills can be divided into general skills and sport specific skills, with the latter consisting of technique and style (Picture 1b, Mero A., 2004, 241). The ability to learn and master skills not specific to a sport

are considered general skills. General skills do include skills used in sports. Sport specific skills include technical skills specifically used in various situations while playing a sport. Sport specific skills also include the ability to correct mistakes in technique and the ability to learn new techniques quickly. Good technique includes learning correct movement patterns. When an athlete can use good technique economically, purposely, and quickly in various situations, he is considered to have good skills. On the other hand, style is a personal way of expression that is a part of the performance. (Mero, 2004, 241).

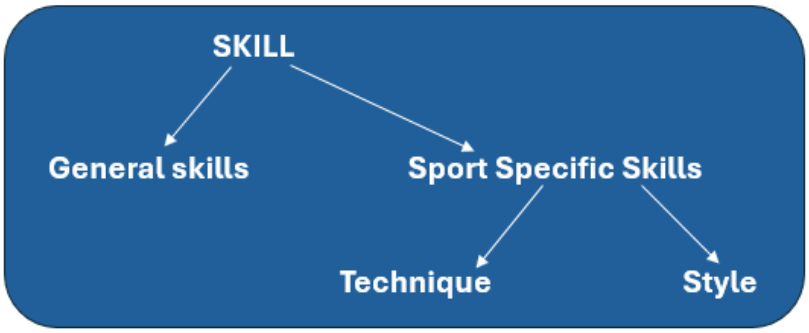


Figure 1b. Skill types (Mero 2004, 241)

There are several general skills that must be mastered in soccer. These general skills include all soccer specific movements with and without a ball. The player's ability to complete challenging technical tasks quickly and smoothly without extraneous movements indicates purposeful skill development (Ahon & Rovion, 1998, 2; Luhtanen, 1984, 5; 1996, 69).

Luhtanen (1996, 69) states that general and sport specific skills in soccer should complement each other. These skills combined make it easier to implement a game strategy. The player's sport specific goals are influenced by their age, talent, physical, and psychological skills, as well as their training background. The player's goals should increase gradually and be proportionate to the quality and quantity of training, as well as their training environment.

2.1 Skill Development and Critical Periods, Do They Exist?

Because of early development of the nervous system, movement and movement skills develop rather early in childhood. The coordination and basic movements that develop between the ages of one and five set the foundation for learning sport specific skills. This development happens naturally. The abilities prerequisites for coordination include orientation, reaction, rhythm, balance, differentiation, and coupling. These skills are not adequate for top level sports performance but rather

need to be developed through active training between the ages of six and ten. Challenging sport specific skills (such as increased power) happen later in teenage years (Mero, 2004, 242.)

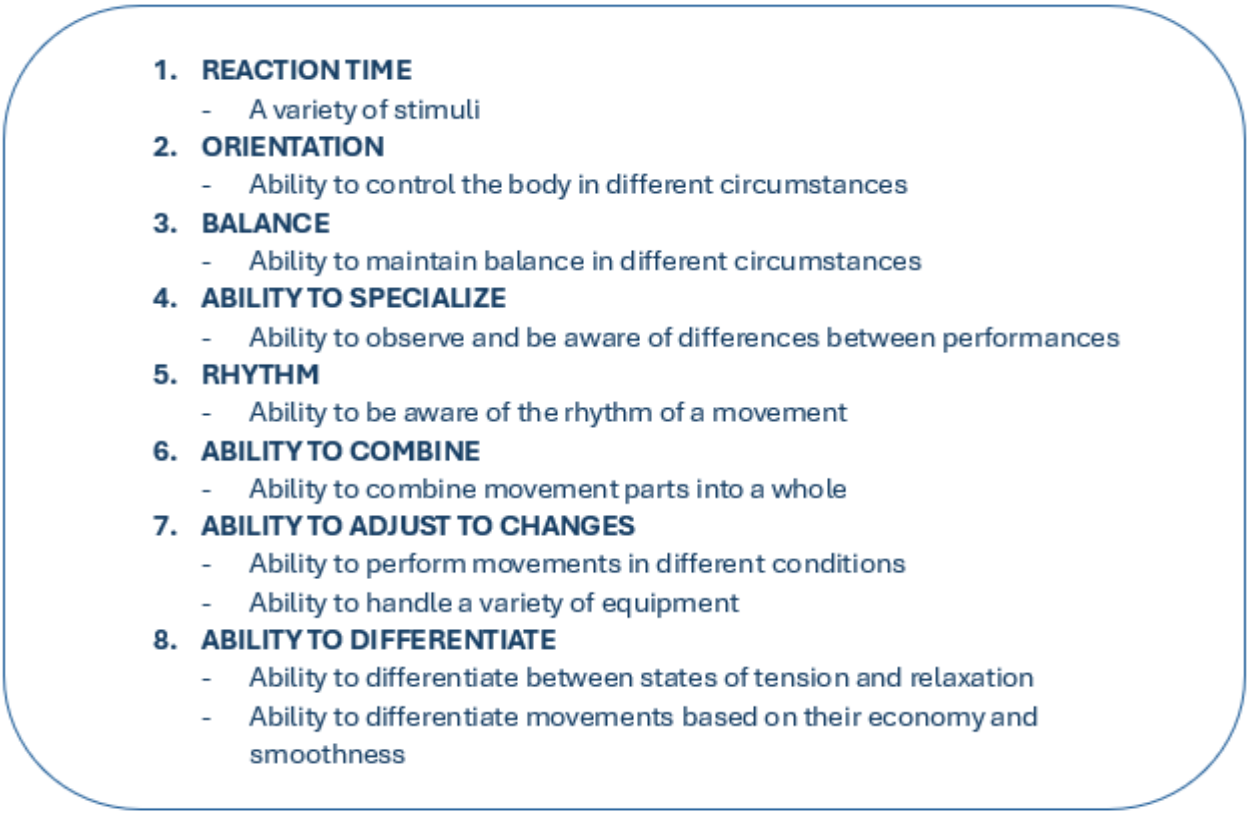


Figure 2. Sub-categories of Skills (Luhtanen, 1996, 157)

The beginning phase in training is usually the most challenging part for athletes. Performance may feel difficult, and the player makes a lot of mistakes. The player may even lack comprehension of the performance they are attempting. Additionally, the player may feel frustrated when other players perform much better than them. The coach is responsible for initiating the learning process properly. Getting the player motivated to continue training is particularly important in the beginning phase of training. As the player's skills increase, the importance of coaching is reduced because the player has increased motivation to improve their skills (Jaakkola, 2010, 94).

In the beginning phase of training, it is important for the player to feel that training and their attempts lead to proficiency in skills. The player should feel accomplished and have a sense of both autonomy and belonging in the social setting of the sport. For the player to feel successful, it is important that the skills practiced are appropriate for the player's level of ability. Drills that are beyond the player's skill level reduce their motivation. The level of difficulty should increase gradually as the player's skills improve. Giving positive, constructive feedback to the player will increase their

sense of self-efficacy. Players thrive on positive, constructive feedback. On the other hand, emphasizing mistakes has the opposite effect. (Jaakkola, 2010, 94).

The sense of social belonging increases as the team practices together. The players receive help and support from their team members. The team struggles with shared challenges and learns to understand each other better. The teammates provide each other vicarious experiences and the players can model other's successful attempts. This allows the players to learn from each other. (Jaakkola, 2010, 94). The cornerstones to intrinsic motivation, ability, and belonging are integral in the early phases of training. The importance of autonomy is secondary. (Jaakkola, 2010, 94).

Learning a skill is a multifaceted event because in the moment of learning, the player interacts with the skill and the learning environment. Another factor influencing this equation is the player's genetic disposition. The exact impact of genetics in the learning process is still unclear (Hakkarainen, 2009, 239).

In skill development, the genetic component or genetically determined critical phases have not been shown to make a clear impact. However, a few studies have suggested that there may be a phase between the ages of five and eight, where the child's agility goes through a fast development. On the other hand, when it comes to balance, there seems to be no such period. Environmental stimuli seem to be the most critical component for skill development. Skill development happens as a direct result from a training stimulus (Hakkarainen, 2009, 240).

2.2 Phases in Skill Acquisition

Skill acquisition can be divided into three phases, which include the beginning phase (cognitive), training phase (associative), and final phase (automation). Students go through these phases each time they practice and acquire a new skill (Fitts & Posner, 1967; Jaakkola, 2010, 63). These phases describe how the athlete's performance develops. These phases are a continuum with the learner gradually moving from one stage to the next (Magill, 2007; Jaakkola, 2010, 63).

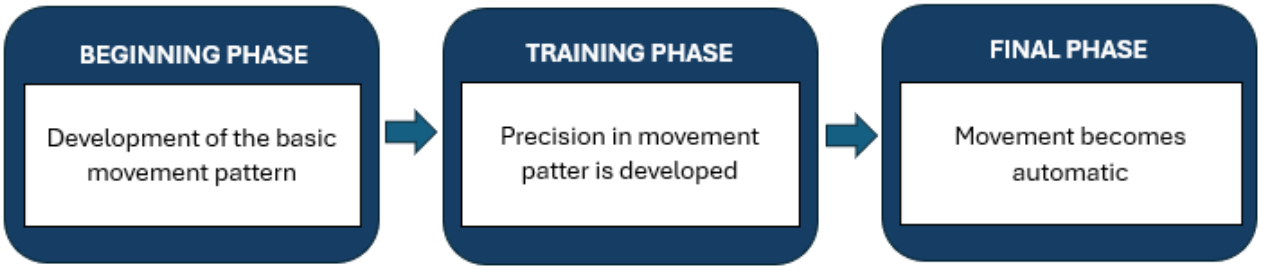


Figure 3a. Continuum of Skill Acquisition (Coker, 2009, 114; Jaakkola, 2010, 63)

Next, we will introduce the stages in learning in more detail. In the first phase of learning, the learner is trying to understand and picture the skill they are attempting to master. (Gentile, 1972, Jaakkola, 2010, 63). The person is attempting to form a mental image of the skill and understand what the skill is about. The beginning phase includes a lot of thinking and other cognitive activities. In the beginning phase the nervous system forms new lose connections important to the skill (Jaakkola, 2010, 64). The learner's performance shows a lot of fluctuation, and they may seem clumsy. This effect is due to the sparse nervous connections in the novice learner (Eloranta, 2007; Jaakkola. 2010, 64).

In the training phase the learner has an image of the skill they are attempting to acquire (Schmidt & Wrisberg, 2008; Jaakkola, 2010, 65). The student is motivated to practice the skill because they have a clear image of the skill, and they comprehend the big picture of the performance (Jaakkola, 2010, 65). Using high repetitions is the key to learning in the training phase (Abernethy, 2001; Jaakkola, 2010, 65). In the training phase, the learner shows relatively correct, steady, and uniform performance of the skill. There is less fluctuation in the quality of the skill performed. In the training phase, the student also learns to recognize mistakes in their performance, and they can self-correct their mistakes. In this phase, the player can focus more attention to their surroundings. The learner can observe things easier allowing them more time for decision making (Jaakkola, 2010, 65).

In the final phase of learning, the person can perform the skill with ease and fluidity without much thinking. In this phase, the skill becomes automatic without much thought or trying necessary (Wulf, 2007; Jaakkola, 2010, 66). In the final phase of skill development, the learner can anticipate events because they are able to collect accurate information and feedback from their surroundings (Savelsbergh, Williams, van der Kamp & Ward, 2002; Jaakkola, 2010, 67). At this stage of learning the nervous system has developed dense and wide networks for the skill. When the nervous network is dense, it transmits information within our brain more effectively and accurately, making the performance more energy efficient. Wide and dense nervous network allows the person to implement the skill in a variety of challenging environments (Schmidt & Wrisberg, 2008; Jaakkola, 2010, 67). Reaching this phase is the result of thousands of hours and years of training. Some researchers have mentioned that reaching this phase requires about 10,000 hours of practice (Ericsson 1996; Jaakkola, 2010, 66-67).

2.3 Multi-sport Athletes

On average, top Finnish athletes engage in three to four sports. The benefits of participating in multiple sports include physiological and motor factors and psychological and social factors are also likely to play a part. Additionally, participating in multiple sports increases total training hours

and variety in training. Participating in multiple sports increases the variety of competitive experiences, developing the athlete's competitive skills. By trying different sports, the athlete is also able to find the one most suitable and enjoyable for them (Jaakkola, 2010, 47).

According to Hakkarainen (2009, 143-144), practicing multiple sports increases the development of different motor skills but they also state that the same effect can be reached by practicing one or two sports. In youth sports, variety in training is also beneficial to overall development of the athlete's body and organ systems. Sports that require a high level of skills have an impact on motor development, but those sports do not always affect the endurance of the athlete. Alternately, endurance sports have the opposite effect. Thus, in youth sports it is important to focus on a variety of training to load each organ system. Organ systems are divided into four main groups: a) nervous system, b) musculature, c) supporting structures (bones, ligaments, tendons), and d) respiratory, circulatory, and metabolic systems. In many sports, different organ systems develop and are challenged at the same time, making it easier to plan training. Hakkarainen mentions that athletes new to a sport and among young kids, organ systems develop regardless of the type of training they participate in. Among more seasoned athletes, training must be planned systematically to maximize training effect. Focusing on training each organ system, allows the coaches to develop a multifaceted and long-ranging training program. Based on this information, early childhood training should include a variety of sports and hobbies to load all the organ systems. By training in multiple sports or by combining sports, variety increases automatically. However, variety can be increased within a single sport as well. Figure 3b shows the organ systems and methods for loading each system. (Hakkarainen, 2009, 143-144.)

ORGAN SYSTEM	EXAMPLES OF EXERCISES THAT LOAD THE SYSTEM
Nervous system	Motor skill practice, drills and games Speed training Power training Maximal strength training
Musculature	Muscle endurance training Basic strength training Plyometric training Functional mobility training
Supporting structures (bones, tendons, ligaments)	Jumping and medicine ball tosses Balance training, drills and games Functional mobility training
Respiration, circulation, and metabolism	Endurance training Speed and endurance drills Muscle endurance training – aerobic metabolism Power endurance training – anaerobic metabolism

Figure 3b. Organ systems and their loading (Hakkarainen, 2009, 144)

Jaakkola (2010, 48) writes that while there are more challenges in single sport training this path can also develop a great athlete. Early specialization in a single sport has been shown to increase dropouts by reducing enjoyment and motivation and increasing health problems. Single sport training can also increase psychological and physical burn out. Support for single sport participation is primarily based on physiological and motor development factors, particularly during the suggested critical periods. However, this premise does not consider the overall growth and development of a child. Additionally, other studies have questioned the proposed critical periods in sports. (Jaakkola, 2010, 48).

2.4 Skill Training

I this chapter, I will discuss skill development in more detail. Participating in a variety of physical activities, particularly in childhood, is important because critical periods in developing skills and technique occur in childhood. In sports that are highly skill based, such as figure skating, ski jumping, and many ball games, sport specific skill training should start prior to age seven. The skill training for these sports should be refined between the ages of eleven and fourteen. In teenage years, learning these skills becomes more difficult due to increase in muscle growth and strength (Mero, 2004, 243–243).

General coordination skills develop simultaneously with general skills. Later, as the athlete begins to focus on sport specific skills, strong and varied basis of coordination is an advantage. These coordination skills, or basic movement patterns develop spontaneously as children play games without any specific training. For example, between the ages of one and two, the child develops movement patterns and handling skills. In this age group, one should emphasize skills and speed, because the neuromotor connections are developing specifically at this age. Between the ages of three and five, general sport skills can be developed more quickly with some directed game play (Mero, 2004, 244).

For the muscular system, nervous system, and other tissues to work together and for the athlete's performance to become skilled, sport specific training should be frequent. For example, running, skiing, swimming, and other full body activities are important through the entire childhood. Learning as many sports as possible gives the athlete a good basis for their later selection of a main sport between the ages of twelve and fourteen (Mero, 2004, 245).

Athletes should practice and develop sport specific techniques through sport specific training and competitions. All training periods should include sport specific activities, to develop and maintain these skills. Learning proper technique should make performance faster and movements more economic. Optimal technique leads to efficient production of force and economic biomechanics.

Learning and teaching technique moves through a high motor phase, eventually becoming automatic. If the athlete's goal is to compete at the top level, their technique should be nearly perfect by the age of thirteen or fourteen. At that point, the athlete should have trained basic technique for three to four years. Starting at age fourteen, the athlete is polishing their technique with the goal of making their performance automatic. At this age, physical training increases to further improve the athlete's total performance. Optimal technique is specifically what helps the athlete reach sport specific performance skills. Practicing technique is particularly important to allow the athlete to recover both physically and mentally (Mero, 2004, 245-246).

Next, I will focus specifically on soccer skills training. After training a specific movement, the athlete stores the movement pattern, or engram in their brain. The quality of this model depends on the amount and quality of the feedback the athlete receives. The coach should prevent the athlete from learning wrong movement patterns. In figure 4 below, we can see the principles that should be used to maximize the learning of correct movement patterns (Luhtanen, 1996, 72).

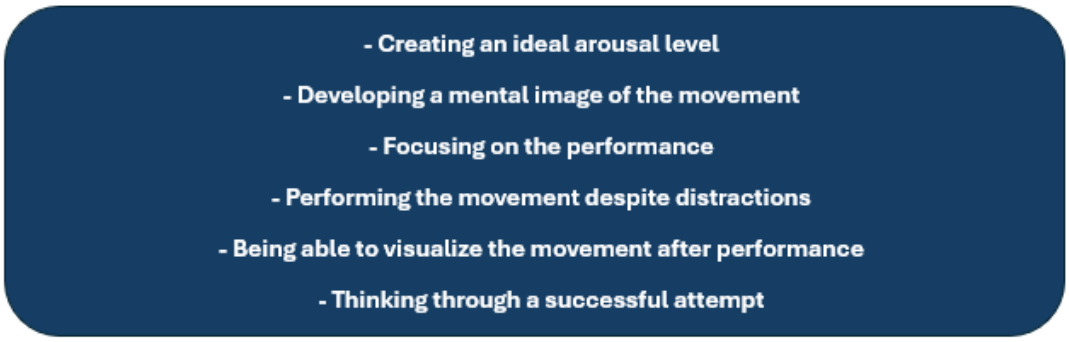


Figure 4. Principles for maximizing correct movement patterns (Luhtanen, 1996, 72)

As the player practices movements, they are using visual ques to control their performance. Additional proprioceptive systems include the joints, muscles, and the somatosensory system. As the athlete learns to pay attention to their proprioceptive systems, they become aware of the angle of their joints, changes in the angle and length of their muscles, loading on their joints, and the striking point and positioning of their foot. These senses strengthen the initial stimulus that they formed through mental imagery of the movement (Luhtanen, 1996, 72). Schmidt and Wrisberg (2001, 92–95) emphasize the significance of sight, particularly its effect on balance.

2.5 Skill Teaching Model

In teaching skills, it is imperative that the coach and the player understand each other perfectly from the beginning. Luhtanen introduces skill teaching in his book, through the excellent model seen in Figure 5 (Luhtanen, 1996, 72).

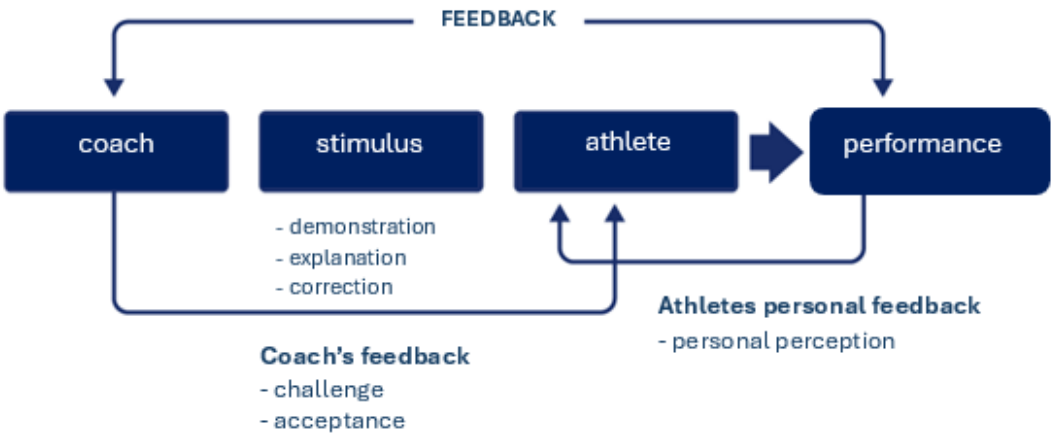


Figure 5. Basic model of teaching skills (Luhtanen 1996, 72)

In a coaching situation, the initial stimulus is the coach's explanation, description, or demonstration of the skill. The coach then encourages the athlete to attempt the skill. When necessary, the coach may use images, series of images, or slow-motion video to assist in explaining the new skill. They may repeat instructions and show images repeatedly when necessary. The most important job of the coach is to provide the athletes with feedback. They should reinforce correct performance of the skill and support the personal somatic feedback the athlete is receiving. The coach should also attempt to correct improper performance or improper personal somatic feedback. The feedback from the coach supports and directs the personal somatic feedback of the athlete. The coach should know basic soccer skills, their foundations, the players' personal characteristics, and their mental connection to skills. Knowing these connections makes it easier for the coach to correct deficiencies in performance (Luhtanen, 1996, 73-74). In providing feedback, the coach should know what information they need to share and how often they should provide feedback. Effective feedback consolidates the information necessary to improve performance. In the early phases of learning a skill, the coach can give feedback more frequently, but they should reduce feedback as learning is progressed. Feedback that the athlete receives immediately after their performance tends to slow down the learning process, presumably because it prevents the athlete from processing somatic feedback and developing their personal feedback system to correct mistakes (Schmidt & Wrisberg 2001, 232-233).

General and sport specific conditioning is a prerequisite for skill acquisition. The general conditioning needed for soccer includes rhythm, balance, and speed. Sport specific conditioning in soccer includes running, dribbling, bouncing, and shooting the ball. Teaching a skill begins with forming a mental image for the skill and includes practicing the specific skill. The next phase, higher motor learning, where the movement is stored in the central nervous system as an engram, starts with developing the skills step-by-step. In the third, fine motor phase, the athlete's movement becomes more precise and major mistakes are eliminated. In this phase the athlete's performance begins to appear smooth and intentional. The fourth phase of skill learning standardizes the performance by having the athlete repeat the correct performance multiple times in normal conditions to make the skill automatic. In the final, highest stage of learning, the athlete's technique is being polished and the player gains confidence in game situations. In this phase, the athlete also gets comfortable using the skill in varying situations (Luhtanen, 1996, 73).

The amount and quality of skills and the player's talent impact the learning outcome. The model for training a skill, according to Luhtanen (1996, 72), is the same as the model for teaching the skill (Figure 5). The goal of training a skill is improving and polishing the overall performance. In this phase, the coach should evaluate the progress and any limiting factors of the player. Skills training should be included in all training intervals. Results of learning are more permanent, if the training and skills acquisition progresses gradually from easier to more challenging tasks. It is possible to make the skill performance more challenging by varying the movements and positions of the offensive player, defender, and the ball. Coaching players in independent skills training is particularly challenging. The coach should consider the age, developmental phase, training background, physical characteristics, and basic conditioning (speed, endurance, strength, and flexibility) of the players when designing personalized exercise programs (Luhtanen, 1996, 75).

The goal of skills training or to produce a permanent, technically correct performance. Through various drills, the players can develop their ability to sense a correct performance. Such training also allows the players to sense differences between movements. Varying the degree of difficulty also has an impact on the player's level of motivation. The player feels that their training is varied and versatile. Learning new skills allows the player to feel successful, further increasing their motivation to learn. Making slight changes in the drill adds variety to training and helps move the learning process forward (Luhtanen, 1996, 77).

2.6 Modern Skills Learning Model

Skills learning used to be viewed as mostly mechanical performance. It did not focus on an athlete as an individual, take into consideration the learning environment or the key factors of the skill being taught. The modern model for learning skills is more holistic. In the modern model, the learner,

the learning environment, and the task being learned form a whole. The interaction of these factors is what leads to learning. (Hämäläinen, 2015, 343).

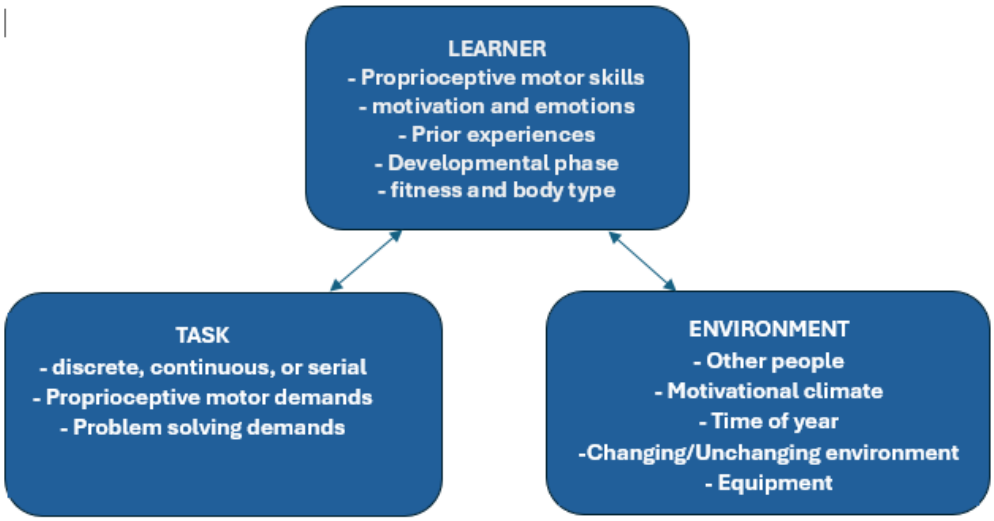


Figure 6a. Modern skills learning theoretical model developed by Karl Newellin (Daviks, Button and Bennet, 2008; Jaakkola, 2010; Hämäläinen, 2015, 344)

The student's personal factors affect the learning process. These factors include motivation, prior experiences, physical characteristics, body proportions, and innate talent. One such factor, important in child and youth sports, is the athlete's motor developmental phase. The individual's proprioceptive motor skills are a major factor in the outcome of learning a skill. Feelings and sociocultural factors also affect learning. These factors include, among others, the impact of family and friends (Hämäläinen, 2015, 343).

The environment also impacts the learning process. The environment may include people who have either a positive or negative effect on learning. These individuals can be spectators or teammates. Other players and people involved form the psychological and motivational climate for learning. Studies have shown these factors to affect feelings, cognition, and behavior (Hämäläinen, 2015, 343).

The third factor in the learning model includes the characteristics of the task. Learning motor skills has specific requirements. Proprioception, planning the activity, and decision-making processes affect the learning outcomes of motor skills. Hakkarainen mentions that in tennis the player experiences situations that require them to anticipate moves frequently. Tennis skills depend on the player's ability to anticipate. On the other hand, in gymnastics, the characteristics of the task

depend on the athlete's ability to view and sense a perfect performance and their ability to listen to their body to execute a clean, correct performance (Hämäläinen, 2015, 343).

2.7. Ecological Dynamics

Ecological dynamics is based on a new idea about an individual's actions and skill acquisition. In this model the interaction between the player and their environment impacts skill acquisition. In ecological dynamics, the player looks around repeatedly and adjusts to changes in their environment. The principle of ecological dynamics is that there is no one correct technique, but that actual skill depends on the player's ability to adjust their performance to the changing environment. The environment and the player's personal space change continually. The ecological model considers observation and action as factors that work together, and the two factors are not separated. It is important to maintain the connection between information gathering and action throughout practice. If necessary, training can be simplified and made easier within the ecological model, but these two components of learning are not separated. In the ecological model, making changes to drills has an increased importance because they allow the player to take advantage of various movements and strengthens the learning of essential information. The goal in this type of training is to push the player towards new movement patterns while avoiding incorrect movement patterns. In an article, Sarajärvi uses the inside push pass as an example of the ecological dynamics model. When passing with the inside, the player is expected to place their supporting leg near the ball, allowing for a technically correct pass with adequate strength and precision. In the ecological dynamic model, the foot does not have to be placed in the exact same position each time, rather the player should have the ability to pass even if their supporting leg is in a slightly different position. The position of the supporting foot varies naturally, for example when another player is pushing on the player. Thus, no two performances are exactly the same and there is no one perfect technique.

Experts of ecological dynamics can perform in demanding situations requiring high skill level. The abilities of such players are not measured in their ability to complete ordinary tasks, such as zigzagging through cones but rather in special game circumstances requiring the ability to adapt (Sarajärvi, 2020).

2.8 Differential Learning

Differential learning is based on creating variability in the target movement and using such variability to provide new feedback to the athlete. The person learns to recognize differences in the movements and learns to adjust to changing circumstances. Through differential learning the athlete forms a wide variety of different movement performances and the constant change has a positive effect on learning (Kalaja, 2015).

Because each performance in differential learning is different, performances are not compared to each other. Not comparing performances increases the athlete's sense of confidence in their performance. Feeling a sense of accomplishment is one of the cornerstones of learning a skill and this feeling increases intrinsic motivation. When skills are coached properly, the athlete feels that they are continually improving, further increasing their motivation (Kalaja, 2015).

Variety and variability are key factors in training sport skills and technique. The amount of variability recommended depends on the skill level of the athlete. Too much variability can make learning more difficult. Professor Keith David has stated that the main cause of difficulties in reaching performance goals among successful and talented athletes is late specialization in a specific sport. This means that training should have variability in childhood and youth sports (Kalaja, 2015).

Variability in training affects the complexity of new neural connections in the brain. However, we should remember that too much variability can lead to reduced transference of a skill and possibly the formation of a loose and scattered nervous network (Schöllhorn et. al., 2009a; Schöllhorn et. al., 2009b; Konttinen, 2015. 21). Thus, in differential learning, drills are planned in such a way that consecutive drills add to previous drills with slight changes (Schöllhorn et.al., 2010a; Konttinen, 2015, 21). Through such slight changes, learning remains effective.

This style of training allows changes in the joints used, the geometry of the joints, speed, acceleration, rhythm, or timing. Additionally, this allows training to utilize a variety of equipment and environment. (Schöllhorn et.al., 2010a; Kontinen, 2015, 21). The basic idea in differential learning is to use small component factors to improve and add to prior performance (Schöllhorn et.al., 2009;. Konttinen, 2015, 21).

3 Game Intelligence

Game intelligence or game IQ refers to the player's ability to understand the game and resolve game situations. Speed and creativity are important components of game intelligence. Game intelligence can be divided into three components. In the figure below, Hämäläinen describes these components (Hämäläinen, 2015, 597).

1. Understanding the game – the child reacts according to what they observe and understand.
2. Reading the game – ability to observe teammates, defense, position of the ball, direction, and speed of movement in reference to the field.
3. Quick decision making – what skills the player uses in resolving game situations

Figure 6b. The three components of game intelligence (Hämäläinen, 2015, 597)

3.1 Game Centered Learning Model

Teaching Games for Understanding Learning Model (TGfU) was developed by David Bunker ja Rod Thorpe in the 1980s. TgfU was primarily developed for teaching physical education and it was developed to balance the traditional methods for teaching skills (Chow et.al., 2016, 163; Kirk & MacPhail, 2002, 177). D. Bunker ja R. Thorpe had observed that the students wanted to play and could not concentrate on the skill drills based on the traditional teaching methods. TGfU primarily focuses on game play and developing game intelligence. Sport characteristics, game intelligence, and problem solving are taught through playing the sport (Numminen & Laakso, 2001; Kemppinen, 2019, 20).

Game centered leaning model has a lot of similarities to the current coaching strategies used in Finland and abroad. For example, in Belgium small games and game-like drills are the centerpiece of training. The coach is not allowed to give too many instructions but rather, the personal problem-solving skills of the child are emphasized (Kemppinen, 2019, 13). In Finland, training is primarily modeled according to game centered learning. The Finnish soccer association also recommends a game centered approach in coaching children (Suomen Palloliitto).

3.2 Motor Cognition

Motor cognition refers to a child's ability to picture their body parts in reference to their surrounding space, available time, and their strength. Body awareness, spatial recognition, and awareness of direction and timing are components of motor cognition. In a general sense, motor cognition encompasses observation, problem solving, and functioning as a part of a larger whole. Performing a sports skill is a motor cognitive activity. Motor cognitive research has determined that motor cognition is a skill that can be learned and taught (Jaakkola, 2010, 62-64). By adding various challenges to drills and games, observational and decision-making processes can be improved. Motor cognitive training develops thinking. Some have suggested that the speed of thought has an impact on running speed in many sports (Hämäläinen, 2015, 594-595).

Benefits of motor cognitive training:
- Faster decision making
- Mental mapping to increase the speed of thinking
- Makes choosing correct action in games and sports easier
- Develops the ability to anticipate actions of other players

(Hämäläinen, 2010. 597)

3.3 Observation and Decision Making in Small Game Drills.

The old saying," You learn how to play by playing" stands true. Game situations require observation, decision making, and quick actions (Hämäläinen et.al., 2019, 596). In coaching children and youth, it is important to develop observational skills. Movements depend on sensory information and processing that information. Thus, improving observational skills will improve sports performance. Spatial awareness is one of the kay factors in motor cognition. An example of spatial awareness in ball sports includes how the players interpret distances between themselves and other players. Understanding width and depth allows an offensive player to find open space when attacking. In various drill and game situations, the player registers modes of action in various decision-making situations. These decision-making models are used in similar future situations (Hämäläinen et.al., 2019, 593-594). Drills and small games require the player to continually observe their surroundings. Thinking and decision making are central to this process. Games and drills are also beneficial for the ability to focus and the child practices their movement, balance, and ball handling skills without paying any particular attention to them (Hämäläinen, 2015, 593-594). It is good to remember that motor cognitive practice improves general observational skills. Sport specific observational skills improve through sport specific training. Both skills can be improved through sport and game drills. In planning training, coaches should consider how to include these components in

practice (Hämäläinen, 2015, 596). The ball carrier makes decisions primarily under pressure, as the defense's goal is to steal the ball by pressing on the ball carrier. It is important to consider observation, decision making and action as a whole that is practiced together (Jaakkola, 2010, 33-34).

Figure 7. Information processing model in motor learning (Coker 2009,25; Jaakkola 2010, 34)

3.4 Intelligent Player - Reading the Game

In soccer, reading the game or soccer intelligence refers to the player's ability to analyze game situations and make quick decisions in the middle of playing. Game intelligence refers to the way that players solve different situations during the game (Kemppinen, 2020, 6). A player who is good at reading the game can separate the essential information from a large amount of observational data. Such a player also has good motor control and the ability to anticipate others' actions. They might be the fastest thinker but not necessarily the fastest runner. With these skills they make important decisions about the game and recognize the formations of the defense (Hämäläinen, 2015, 595).

Making repeated and novel decisions in problem situations requires "fluid intelligence." In soccer, "fluid intelligence" is strongly tied to abstract thinking, memory, and cognitive processes. One should, however, differentiate between "fluid intelligence" and "general crystallized intelligence", which refers to the cumulative results of knowledge and skills gathered from coaching and experience. Fluid intelligence is at its best in early adulthood (Kemppinen, 2020, 6-7).

Training can improve the ability to read the game. The training environment should activate spatial orientation and timing. Spatial awareness can be taught to even small children (Hämäläinen, 2015, 595).

3.5 Activating the Player's Thinking

To encourage the players' active participation in training and understanding of certain game situations, the coach should master open ended questions, which is the most effective way to encourage thinking. Closed ended questions only require a "yes" or "no" answer and they do not encourage the players to ponder the situation. Open ended questions often begin with the words: what, when, and how much. Open ended questions lead to the players understanding game situations and problems that they were not able to comprehend previously. When answering open ended questions, the player must think, evaluate, and deduce prior to finding a solution to a problem. In the opposing model of instruction, the coach simply instructs and tells the players what to do in each game situation. However, this type of teaching does not require the players to think about an answer and therefore it does not induce active thinking (Wein, 2001, 8-9).

4 Digital Learning Environments

As the world moves toward a more digital direction, learning and teaching must develop. Information systems and the network environment have become part of our daily life. Because of this, learning is no longer limited to a specific location but rather happens throughout life in many environments. Virtual learning environments that take advantage of modern cloud services are a part of current teaching. Electronic learning portal advances learning no matter the time and space (Ekman, 2016).

A good digital learning process includes active video and the opportunity for conversation and feedback. Learning is not limited to a specific time, place, or terminal. Digital materials allow the student the opportunity to return to any materials they wish to review. This allows anyone to learn the basics easily. However, digital learning does not replace the usual interaction and traditional teaching and coaching (Kallio, 2017).

In this chapter, I will focus on changes in technology, the utility of websites, and the use of video materials in teaching.

4.1 Technological Changes

It is important to recognize the environments that young people and adults operate in, when creating current and future coaching materials. Technological devices, such as mobile phones, tablets, and laptops have for a while been a part of everyday life for youth and adults alike. As technology has developed and become more common place, the way that people search and receive information has changed. According to a study conducted by Statistics Finland (Tilastokeskus, 2020), 92% of 16 to 89-year-olds take advantage of the internet (Table 1) Hundred percent of all 16 to 34-year-old Finns and 99% of 35 to 44-year-olds report using the internet. Of those under the age of 44, 97% report using the internet more than once a day, while 93% of those over 45 report doing so. The internet is a part of nearly everybody’s daily life both at work and during their free time (Tilastokeskus, 2020).

Group	Uses the internet	Uses the internet several times a day	Buys on the internet	Makes calls on the internet	Follows social media
16-24	100	98	62	87	92
25-34	100	97	77	91	92
35-44	99	97	80	86	86
45-54	99	93	70	82	80
55-64	97	83	46	69	60
65-74	88	62	25	55	46
75-89	51	30	8	19	16
Men	93	83	56	69	66
Women	91	80	53	74	71
All	92	82	54	72	69

Table 1. Internet utilization rates and purpose of use. Percentage of population. (Tilastokeskus 2020)

According to Statistics Finland (2021), accessing the internet through a mobile phone is very common (Table 2). Eighty four percent of the entire population reports accessing the internet from their phone. In the 16 to 34-year-old group this percentage reaches 98% with 97% of 35 to 44-year-olds, and 96% of 45 to 54 accessing the internet from their phone. The high level of internet use through mobile phone can be seen as a desire to access services regardless of time and location. Internet use through a desktop computer is 77-82%, while internet use on a tablet is more varied between age groups ranging between 24 and 53% (Tilastokeskus, 2021a).

Age group	Tablet	Laptop	Desktop	Mobile phone	Other mobile device
16-24	24	82	37	98	20
25-34	34	80	41	98	15
35-44	45	79	33	96	14
45-54	53	77	34	95	15
55-64	50	70	30	86	9
65-74	38	55	23	69	3
75-89	21	32	14	28	2

Table 2. Internet use on various devices 2021, percentage of population. (Tilastokeskus 2021a)

Utilization of video services, such as Youtube and Vimeo are commonplace for many young people and adults (table 3). On average, 94,5% of 16 to 54-year-olds have used these video services. (Tilastokeskus, 2021a). Therefore, it is clear that this technological breakthrough should be taken advantage of when creating coaching content because it provides many opportunities for advancement in coaching materials.

Age group	Internet TV service (YLE Areena, MTV katsomo, Nelonen ruutu etc.)	Pay per view (Netflix, HBO, Nordic, etc.)	Internet video services (Youtube, Vimeo, etc.)
16-24	80	87	98
25-34	86	83	97
35-44	84	72	92
45-54	83	56	89
55-64	80	38	71
65-74	67	17	46
75-89	37	7	16

Table 3. Internet TV and internet video service use, percent of population (Tilastokeskus 2021b)

4.2 Website Function

Next, I will discuss the usability, user experience, responsiveness, navigation, and visual qualities of products, services, and internet pages.

4.2.1 Usability

The most important feature of the internet is its usability. If the service has poor usability, the consumer will quickly switch to another competing site. Nielsen (2000, 8-9) mentions that the user should be able to navigate a site within a minute of access or otherwise they are wasting their time (Nielsen, 2000, 8-9). Usability refers to the ease of use of a product or service. Good usability includes ease-of-use, efficiency, and lack of errors in use. Good usability leaves the customer feeling happy, encouraging them to stay on the site longer. Good usability does not imply that the service has utility. Thus, the product can have good usability but be completely unnecessary for the consumer (Viljanen, 2020). Usability and utility combined determine if the product is useful. It is not enough for a product to be easy to use if it does not meet the needs of the consumer (Nielsen, 2012). Usability does not refer to the visual characteristics of the product, or the way the product looks. The visual characteristics and its functions are part of the user interface, which takes usability into consideration (Viljanen, 2020).

A respected expert, Jacob Nielsen has described usability through five components of quality (Nielsen, 2012).

1. Learnability	How easy is it for users to handle basic tasks the first time that they encounter the design?
2. Efficiency	Once the users have learned the design, how quickly can they perform tasks?
3. Memorability	After a period of no utilization, how easily can the users reestablish proficiency?
4. Errors	How many errors do the users make, how sever are the errors, and how easily can they recover from the errors?
5. Satisfaction	How pleasant is it to use the design?

Figure 9. The five components of usability (Nielsen, 2012)

4.2.2 User Experience Design

User experience design is divided into two areas - user experience and user interface design. How the user experiences, understands, reflects, and feels while using the product refers to user experience (Viljanen, 2020). User interface design refers to how design problems are solved. How meaningful the product is to users and its ease of use determine the effectiveness of the user experience design (Virtanen, 2016).

Most importantly, the user experience design should meet the needs of the consumer. Secondly, the consumer should be satisfied with the ease of use of the product. One factor that affects this is the simplicity of the product. An effective product design has been achieved only when all the services are properly connected. This encompasses planning, marketing, graphic design, industrial design, and the user interface design (Nielsen, J; Norman, D).

One of the most known ways to assess user experience design is the honeycomb analysis developed by Peter Morville. It allows the designer to map out the challenges and strengths of a user experience design (Wesolko, 2016).

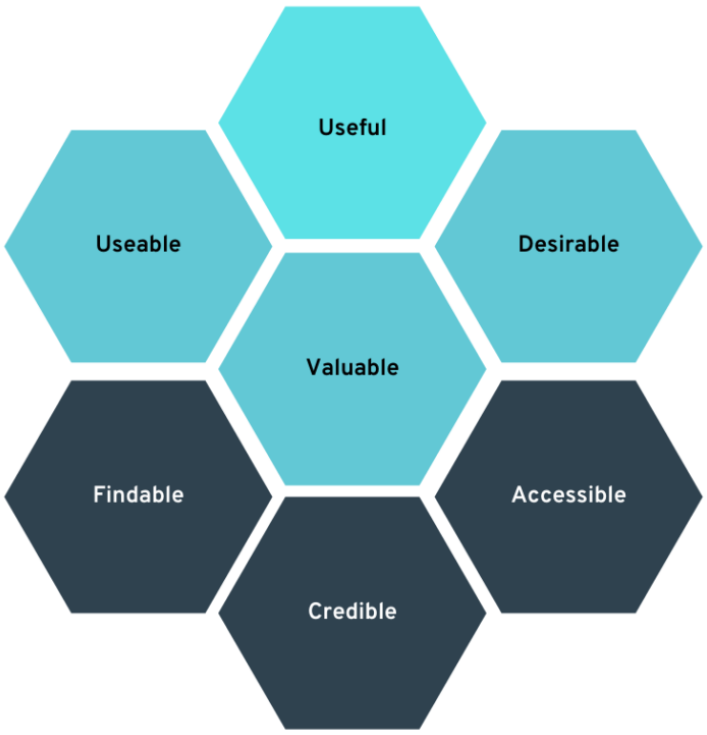


Figure 10. User experience honeycomb by Peter Morville (Wesolko, 2016)

According to this diagram, user experience design can be assessed in the following manner. (Wesolko, 2016):

Useable	The product or service should be simple and easy to use. The design should be easy to comprehend.
Useful	The product or service should be useful and bring added value to the consumer. If a user does not find the product useful, they are unlikely to return.
Desirable	The product, service, or system should be visually appealing. Design should be simple with the necessary information easy to find.
Findable	Information should be easy to navigate and find. Problems should be quick to resolve. Navigation should be designed in a way that makes sense.
Accessible	The product or service should be designed in a way that allows special needs individuals equal access to the product as other users.
Credible	The consumer should trust the company and its products or services.

Figure 11. Facets of user experience design (Wesolko, 2016)

4.2.3 Responsiveness

It is difficult to scroll non-responsive pages on a mobile phone. It makes finding information difficult, particularly if important buttons for selection are missing. This design flaw has a direct impact on lowering consumer satisfaction and making the user leave the page faster. Usually, in well responsive pages the selection buttons, on a mobile device, are located at the top bar of the page. This design feature makes it easy to navigate the page and allows for the titles of the pages to show up clearly, making it easier for the consumer to find the information that they are seeking (Digitoimisto Viisam, 2021). A website with good responsiveness also scales the page according to the device used. The website will work well on a computer, tablet, and mobile phone. The content layout looks good on any device used.

The layout has a clear impact on consumer experience. When pages are user friendly, consumers stay on the site longer (Suovesi, 2022). One factor that affects consumer experience is how the text appears on the screen. The customer should not have to zoom in to read small text. Better usability reduces the number of times that a consumer leaves the page early (Sivutoimisto, 2018). According to a study by the Statistics Finland (Tilastokeskus, 2021), over 95% of people under the age of 55 use a mobile device to access the internet. In 2021 over 55% of internet use was done on a mobile device with the rate of internet use through mobile phone increasing over the years (Sivutoimisto, 2018). Because consumers are using various devices at different times, it is important for a page to work well on any device to have a good user experience design. A page with good user experience design has been planned carefully regarding responsiveness (Aatu, 2022).

4.2.4 Navigation

Website navigation refers to the way that a consumer can move between different components of the website. Good navigation has a major impact on the usability of the site. A website menu bar is a key for good navigation. The goal is for the consumer to be able to access the information on the page quickly and easily. The purpose of site navigation is to direct the consumer in finding information. Navigation is comprised of titles and links. By clinking links, the user is directed to the page they are looking for. To make navigation as easy as possible, links must be clear to make it easy for the consumer to understand the content of drop-down menus (Välimäki, 2008,16; Ellonen, 2018, 13).

4.2.5 Visual Design

The design of a website has a major impact on how well users will like the page (Basse, 2019). Hassinen (2021) states that users form their first impression of a website within 0.05 seconds. The visual design of the page accounts for 94% of the consumer’s first impression of the page.

(Hassinen, 2021). The visual design of the page should be as simple as possible. A good visual design will make finding products easier, leaves a clear image of your page, and keeps customers on the page longer, which increases the pages visibility on search engines (Basse, 2019). Essi Virtanen (2021) mentions in her blog that typography, the planning of fonts and text, is one of the most key factors in visual design. Typography is particularly important for pages that contain a lot of information. Well planned typography makes navigation and studying pages easier, and it encourages consumers to read more. It is not ideal to fill a website with text and pictures because this makes the page more difficult to read. Leaving plenty of space around text makes it easier to read. Colors should be used in moderation. A page that has too many colors is difficult to view. One can add color tones by making the main colors lighter or darker. A page should not have more than 3-4 colors. The human brain processes pictures much faster than text. This is why pictures can gain a consumer's attention much more effectively than text (Virtanen, 2021).

4.3 Use of Videos in Teaching

Videos have been used as supporting materials for decades (Yuen, 2016). More people desire to view videos to learn new content. Instructional videos are a great additional resource in teaching, even if not everyone is using them (Harley, 2020). Because of technological advancements, more videos are utilized for teaching and learning. Videos make it possible to explain things that are difficult to convey through writing or pictures. Additionally, interactive videos allow students to view content repeatedly, enabling them to pause and repeat when necessary increasing comprehension and self-directed learning. Videos are a particularly popular learning tool for people with short attention spans (Yuen, 2016).

Videos are especially effective in supporting other teaching modalities. Videos make it possible to present details of the skill the student is learning. A quality video can help the student comprehension and it conveys the information presented more clearly. A student can support their own thinking with videos, increasing their motivation (Miettinen, 2019, 24).

A study by Harley (2020) examined the use of online videos. The conclusion was that instructional videos offer additional support for students who are learning new or complicated material. It is not always certain that users watch the videos, but they view the availability of videos as a positive feature of a site. Some users benefit from being able to view a section several times by using videos (Harley, 2020).

A well-produced video engages a student and thus advances learning. Videos should be short and include verbal and visual cues. Narration is more effective than text for explaining the content of a video. Videos should not include information not pertinent to learning the intended task. Special

effects and cluttered background have a negative effect on learning. A video should emphasize the key points for learning to help the student focus on the essential points of the task. This also helps the viewer remember and apply the information (Hakanurmi, 2022).

Because of advancements in technology, videos are used more than ever. Videos make it possible to convey things that might not be possible to explain through text and pictures (Heikkilä M., 2021). Videos are particularly good for describing activities and movements (Grano, 2018). When a student views and listens to a video, they get a more realistic image of the task being learned (Rinne H., 2020). Videos serve as great supporting material for a student. Utilization of videos has been found to have a positive effect on learning. By watching the performance on a video, the student can connect what they are seeing to the information they have learned. Videos make it easier for the student to internalize and remember the key points of what they are learning. The student can take advantage of videos anywhere at any time. Videos also make reviewing and checking the key points of an already learned task possible. All the above-mentioned factors make the learning process faster (Heikkilä, 2021).

A quality video has a good structure, clear and defined objectives, and concrete content. The image and sound should be of good quality, and the video should progress in a logical order. The learning objectives should be easy to comprehend. Transitions, such as zooming in from a scenery to a close-up, should not be too quick. Having subtitles in an instructional video makes it easier to comprehend the content (Heikkilä, 2021).

When producing a video, one should first visualize its structure and content. After forming a vision, one should write a script that includes a description of what will happen in the video. The purpose of the script is to serve as a framework for the video. The script should divide the content of the video into clear and manageable scenes. Additionally, the script should include all the elements that will be used in addition to the image, such as text, narration, music, and animation. Instructional videos should be short. If necessary, a video can be divided into several segments (Heikkilä M., 2021). An instructional video should be less than two minutes. It is more likely that people will view the entire video if it is short. (Kuokkanen, 2019.)

Kuokkanen (2019) mentioned the following advice for producing a video:

- Decide specific learning objectives for the video

- Consider what your target audience already knows about the topic

- Plan the most appropriate structure or plot for the topic

- Take advantage of interactive elements to maintain a viewers' interest

- Keep the videos short and split topic areas into multiple clips, when necessary

(Kuokkanen A., 2019)

5 Objective of the Development Project

The objective of this development project is to create a plan for the improvement of www.mobilesocceracademy.fi digital PDF soccer coaching materials. The improved product will be designed for the coaches of 8 to 9-year-old players of the Pallo-Pojat Juniors soccer club. This development project is conducted for a project-based master's degree.

The final goal of this development project is to create a more comprehensive and easier to use product with digital PDF materials and videos that makes planning, implementing, and organizing training easier for coaches.

5.1 Starting Point for the Development Project

Mobile Soccer Academy (MSA), a service that I created, has been available for eight years. The service includes over 1000 hours of video materials to support coaching, team training, and individual training. Coaches can access the training exercises and drills directly and they have been divided according to theme, age group, and level of difficulty making the service applicable to all coaches regardless of the team's skill level.

Based on the feedback received in 2018 from coaches who used the service, it became clear that further development was necessary to meet the coaches' needs better. The digital PDF materials, which allow easy viewing of the MSA videos was completed in 2018. The specific purpose of this project is to assess and develop a plan for further improvement of the digital PDF materials.

The decision to develop a digital video service for soccer coaches was based on my personal experience that made me believe that digital materials could be a benefit in coaching. I had found it challenging to explain training programs and individual drills to other coaches. I also realized that there was a good chance that digital materials could improve coaching outcomes. I published Mobile Soccer Academy digital coaching service in 2014. It has since been used in Finland and abroad. I am certain that my work in this area is rooted in my long-standing interest in digital materials and their use in coaching. Already in 2006, as my final college project, I focused on one soccer skill area. That project also involved video materials.

5.2 Process and Methods of the Development Project

My master's project is a process analysis of a developmental project. The method of process analysis is used when a team is attempting to find solutions to problems or trying to affect change (Ojasalo et.al., 2020, 58). This project used engagement tools to further develop digital PDF materials. These tools were a questionnaire, expert interviews, and a brainstorming workshop.

Process analysis goes through stages, cycling through planning, observation, evaluation, and reflection. After this cycle, the plan is evaluated, and the stages can be repeated several times. A process analysis focuses on "how things should be" rather than "how they are." A process analysis is a study that engages people with the attempt to draw from the knowledge and skills of other individuals in the organization. Data is collected through questionnaires, group discussions, brainstorming sessions, interviews, or observations (Ojasalo et.al., 2020, 58-61).

I conducted a process analysis for the Pallo-Pojat Juniors soccer club. I was employed as full-time staff for the club, and I had been considering further development of my Mobile Soccer Academy service for several years. However, in prior years, I had not had adequate time for this project. As I was considering the topic for my master's project, it was easy to choose this topic because of these reasons. I also feel that this work has clear added value for the coaches of our club and this service will assist their day-to-day operation. During my development project, I enlisted the coaches of our club, as well as a few other clubs, for the project. I gave the coaches two different digital PDF materials to use for three to four weeks (appendix 2 and 3). After the trial period, I asked the coaches to fill out a questionnaire (appendix 1). After the coaches had returned the questionnaires, I spoke with several of the coaches discussing specific ideas and targets for further development. Interviews are often a fast way to collect valuable information for development plans (Ojansalo et.al., 2020, 106). I also personally find interviews a natural way to collect information. During the interviews, the coaches and I focused on specific ideas and targets for developing the materials. The goal was to receive more in-depth information from the coaches. In an interview, the interviewer collects the information and attempts to ask questions to collect information that helps solve problems in the development project (Ojansalo et.al., 2020, 106).

In my interviews, I used both quantitative and qualitative methods for data collection. Quantitative methods are used to collect numerical data through different methods of measurement (Vilpa, P). In qualitative research, the goal is to analyze a topic comprehensively. Values have an additional impact on how we choose to interpret a subject (Hirsjärvi et.al., 2009, 161). Process analysis is described as a qualitative study that can take advantage of quantitative tools (Ojasalo et.al., 2020, 58-61).

Questionnaires are one of the most popular data collection methods that allows researchers to collect large amounts of data quickly and efficiently (Ojasalo et.al., 2020, 121). I used both open-ended questions and multiple-choice questions in my questionnaire. Open ended questions allow the participant to fill in an answer. Multiple choice questions include pre-selected answers for the participant to select from. These questions can include two or several answer choices. The choices can also include “other” where the participant can fill in their own answer. This option can bring up new patterns of thought that the investigator had not previously considered (Hirsijärvi et.al., 2009, 198-199).

After the participants returned the questionnaires, I arranged a brainstorming workshop remotely (see section 6.3). The purpose of this workshop was to collect the coaches’ viewpoints, thoughts, and know-how to support the development plan. It was challenging to find a time when all the coaches were available. After finding the time, six coaches participated in the session.

A brainstorming workshop is considered a creative technique for solving problems and its purpose is to stimulate new ideas, approaches, and solutions to a problem. It is important to consider the perspectives of the members of the group and strengthen shared understanding of various areas of the topic that is under development (Ojasalo et.al., 2020, 160-161).

According to Ojansalo, creative problem solving is a process that involves:

1. Noticing problems and targets for improvement.

2. Identifying facts and perspectives associated with the problem.

3. Visualizing and setting goals.

4. Creating approaches and ideas.

5. Assessing ideas and selecting solutions.

6. Gaining acceptance and Implementing solutions.

(Ojansalo et.al., 2020, 159)

6 Phases of the Development Project

This development project had five phases. The project started with a pilot test of the PDF materials in February of 2022. The questionnaires and interviews were conducted in March and April. The brainstorming workshop to reflect more deeply on topics that had emerged occurred in April. The project was completed with a write up of the further development plan for these PDF materials. This further development plan includes the improvements that are recommended to make the PDF materials serve the users of the service better than before.

February – March 2022	Pilot testing digital PDF materials (MSA) with the coaches
March 2022	Questionnaires with coaches
March – Aril 2022	Expert interviews with coaches and graphic designer
April 2022	Brainstorming workshop with the teams coaching staff
April 2022	Finishing the development plan for future improvements

Figure 12. Plan of action for the development plan

6.1 Pilot test with the Coaches

I gave both versions of the digital PDF materials (appendix 2 and 3) to 25 coaches for pilot testing for three to four weeks. The coaches are associated with four different teams with most of them working with PPJ. The intent of the pilot test was to collect the coaches' views of each version of the materials based on their actual user experience. I collected this information through a questionnaire, interviews, and a brainstorming session.

6.2 Results of the Coaches' Questionnaire

I developed a digital questionnaire (appendix 1) for the coaches who had participated in the pilot test to collect their views about the materials – their benefits, suggestions for improvement, and potential opportunities for further improvement. I conducted the questionnaire in March of 2002. I sent the questionnaire to twenty-five coaches with twenty-two coaches returning the form. I was satisfied with the rate of response.

The coaches who responded to the questionnaire have coached soccer between 1-38 years, so the participants in this study have a wide range of experience levels. The median years of experience in this group was 6.5 years. This group included coaches of both boys' and girls' teams. Their

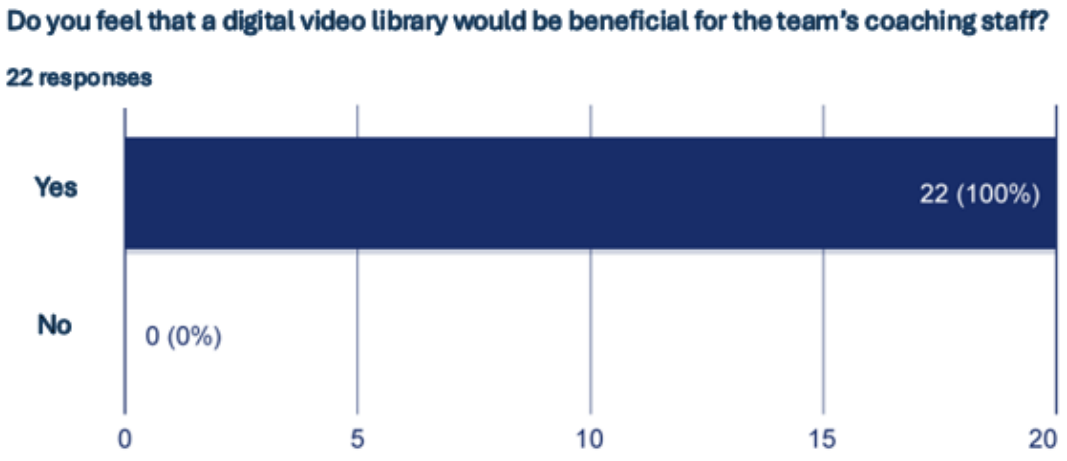
level of training as coaches also varied widely from a starter course all the way to a UEFA A coaching license. The median in training in this group was age specific training (8 to 11-year-olds) and UEFA C coaching license.

I used Google forms to implement the questionnaire. Google forms is a great tool for questionnaires. I sent the coaches an email with a link to the questionnaire. The questionnaire included several multiple-choice questions with pre-selected answer choices to allow for easy numerical and graphical methods to pool the data and ability to create tables for comparisons. Some of the multiple-choice questions also included a follow-up question that allowed the participant to explain their answer. Some of the questions were open-ended.

I will cover the coaches' answers in more detail in later chapters. I will not cover the answers in the order that they were presented but rather, I used the answers to form over-arching themes. I split the coaches' answers into these six themes: need for a video library, materials as part of coaching work, benefits of the materials, ease and function of the materials, suggestions for improvement, and quality of videos.

6.2.1 Need for a Video Library

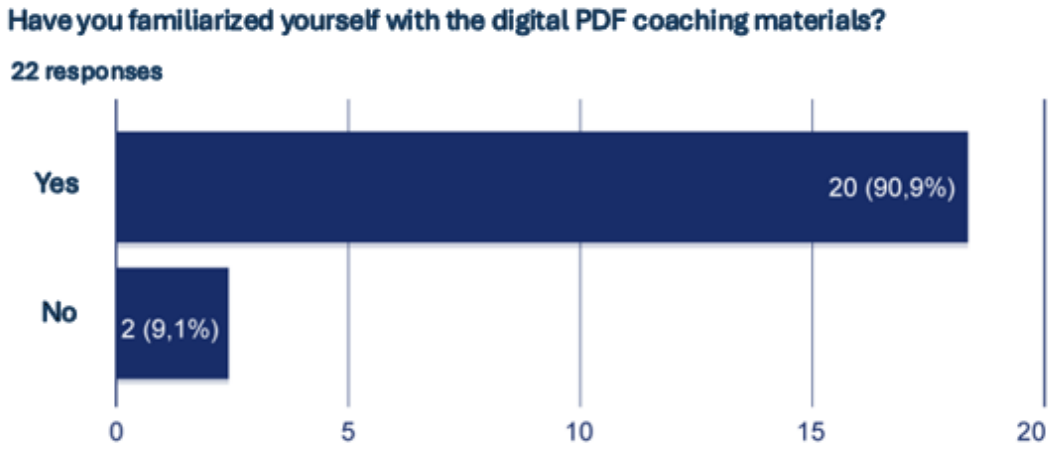
In question number seven, I asked the coaches if they thought that having a digital video library available for their club would be beneficial. This question received a clear answer indicating that the coaches thought a library was needed and beneficial. All coaches (100%) agreed that having a video library would be a benefit. A study by Statistics Finland (2021) also supports this viewpoint and discusses the importance of recognizing the modern-day environment, which includes the daily use of technology (Tilastokeskus, 2021a). Coaches also desire to use modern technology to allow easy and fast access to information.



Graph 1.

6.2.2 Digital PDF Materials in Coaching

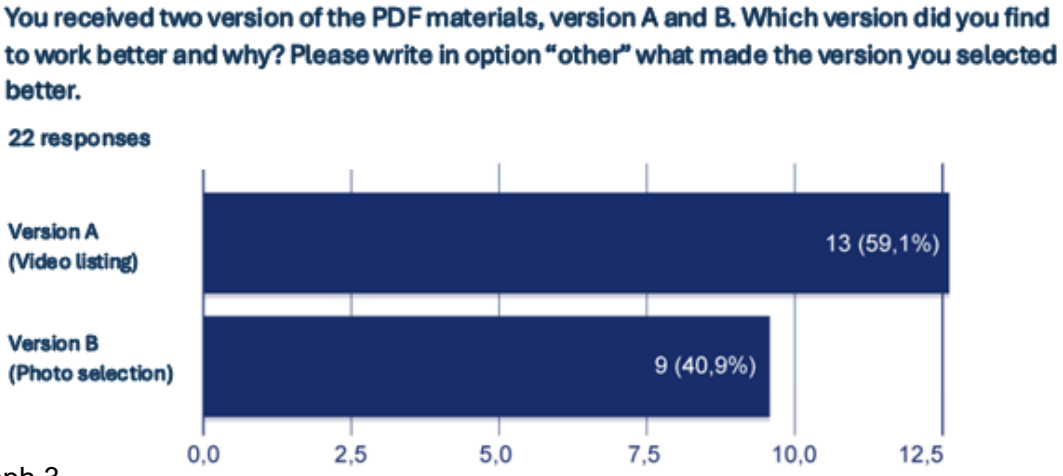
The digital PDF materials include a video library designed for the coaching of 8 to 9-year-old players. Each skill subgroup is divided into skill exercises and both fundamental and small sided game drills. In question number five, I asked the coaches if they had familiarized themselves with the materials. Out of the 22 coaches who responded, only two reported not having looked at the materials prior to the questionnaire. The rest of the coaches had familiarized themselves with the materials and they had experience using it during the pilot test. Thus, we can conclude that the coaches' answers are valid and based on their user experience.



Graph 2.

Two versions of the PDF video materials are the central part of the mobilesocceracademy.fi online service. In version A (see attachment 2), the exercises are listed below the main categories. This A-model is quite basic and at the same time an uncomplicated way to display the training sub-categories. Instead of a listing, version B (see attachment 3), has a picture of a soccer field that helps the user visualize various game components. The image allows the user to click and access links to drills specific to each game component.

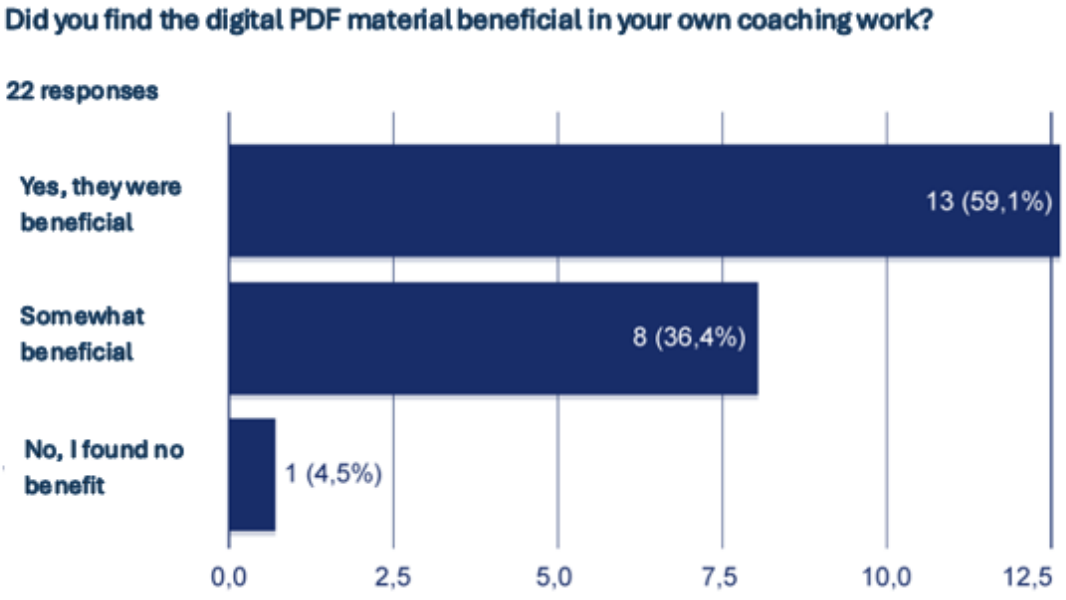
Out of these two choices, most of the coaches preferred version A (59.1%, 13 responders), while 40.9% (9 responders) preferred version B. The difference was small and may only reflect a personal preference for the visual design of the product, rather than functionality.



Graph 3.

6.2.3. Benefits of the Digital PDF Materials

In question six, I asked the coaches if they had found the PDF materials beneficial in their coaching work. I will present the results in graph 4. Out of the responders, 59.1% stated that they found the materials beneficial and 36.4% felt that that they had gained some benefit from the materials. One of the coaches (4.5%) responded that they had not benefited from the materials. These responses show that the coaches clearly found the materials beneficial. The materials brought the coaches added value for their work and they gained new ideas from the comprehensive library of exercises. In his thesis, Heikkilä (2021) writes that videos allow people to visualize exercises that cannot necessarily be communicated in text or photos (Heikkilä, 2021).



Graph 4.

In questions 6a, the coaches were able to explain their answer to question 6. I asked them to describe what type of help the PDF materials had provided them. I also asked the coaches to think of any specific examples of how the materials could help coaches in their day-to-day work. Question 9 was similar to question 6a. In this chapter, I will cover answers to both of those questions.

The following four themes emerged based on the coaches' answers to questions 6a and 9: Comprehensive video library (5); new ideas and thoughts about training (11); easy to use (3): and good way to visualize exercises (3). In parenthesis, I have included the number of coaches that reported each benefit.

The coaches qualified their answers regarding the comprehensiveness and ease of use with statements, such as:

-" The video library was very comprehensive. I personally selected some exercises from it, but the biggest benefit was that it made it easier to communicate drills to assistant coaches"

-" In planning training, it's a good idea to seek a wide range of information. The video library makes finding specific drills easy and the quality of the materials is good."

-" Topic areas allow one to seek appropriate exercises for a theme. Checking skills levels brings up appropriate exercises for your group. Watching the videos several times makes understanding and remembering the exercises easier."

Many of the coaches also felt that they gained new ideas and thoughts about training:

-" Yes it was. I gained new stimuli and ideas for different drills, while considering the players' skill level."

-" It was helpful. With these materials I was able to plan practice sessions wherever."

-" The materials provided great ideas and variety for training."

-" I gained inspiration to develop my own drills based on the materials."

-" In the role of head coach, I benefited in many ways – in running practice sessions and in assisting with the coaches' daily work and in finding great solutions for training."

One coach wrote about the visualization of drills:
-" Being able to visualize drills and see them in planning phase helps deepen my own perception of the training topic. It is also certainly beneficial to go over drills and their key points [with these materials] with players"

6.2.4 Ease and functionality of the digital PDF materials

The theme of question number eight was the functionality of the digital PDF materials. In this question, I asked the coaches' opinion on whether the materials worked and if they were easy or difficult to use. In this section I will cover answers that allude to ease of use. In chapter 6.2.5, I will cover answers that describe any difficulties or challenges that the coaches brough up when discussing ideas for improving the materials.

Overall, the coaches thought that the materials were easy to use. Seventeen people responded that the materials were either very easy or easy to use. Viljanen (2020) writes in an internet article that the functionality of a product is well assessed by ease of access, smoothness of use, and lack or errors. Good functionality leaves the user with a positive view of the product, and they will stay on the page longer. According to feedback from the coaches, we can assume that this product has good functionality. Some of the coaches gave feedback on why they felt positive about the functionality. Here are some of the answers that emphasized ease of use:

-" The *materials were planned to be easy to use and the PDF materials were visually pleasing, while being adequately clear and easy to read."*

-" It was easy, even for me, a person without a lot of technical know-how."

-" It was the easiest and best way that I have bumped into."

- "Easy to use. The themes allow you to nicely click for more detailed information on what each theme is about and/or to access the videos."

-" Easy. 10 points."

6.2.5 Recommendations for Improvement in the Digital PDF Materials

In this chapter I will cover the coaches' answers to questions 6b, 10, and partially question number 8. In question ten, I asked the coaches to describe how they would further develop the PDF materials and if they had any ideas for improvement for the materials. In questions 6b, I asked the coaches who had not found the materials useful, how they would improve the materials. In question eight, I examined the ease of use of the materials. In this chapter I will cover the answers to question 8 that reported no problems with using the materials. I also asked the coaches to explain their answers and provide feedback for improvement.

The following four topics emerged based on the coaches' answers to these questions (in parenthesis, the number of times each topic was mentioned): expanding the drills to include coaching the goalie and older age groups (3); the pages not scaling properly on mobile devices (3); difficulties in accessing the page (3).

Suovesi (2022) mentions scaling of pages in a blog. Scaling of a website has an impact on customer experience and customers spend more time on pages that scale well on a mobile device (Suovesi, 2022). Three of the coaches mentioned specifically that they found using the materials difficult on their phone. These materials do not scale according to the device used and this issue can be improved to increase functionality.

Here are a few examples of the coaches' answers to questions 6b, 8, and 10.

-" These materials could be expanded to include coaching the goalie and other age groups."

-" I found using the site difficult on the phone."

-" Condensing the materials based on the coaching style of the team."

-" I found there to be a wide variety of drills, so some of the excellent drills may end up hidden in the sheer volume of materials."

-" The only weakness was that one had to always be logged in to access the materials."

-" The only change I would make in the system is to make it easier to find the next video within a theme once you have clicked on a theme by grouping them all there. Also, moving from one theme to another could be made easier by adding a quick link to the next theme so that one does not have to navigate back to the previous page."

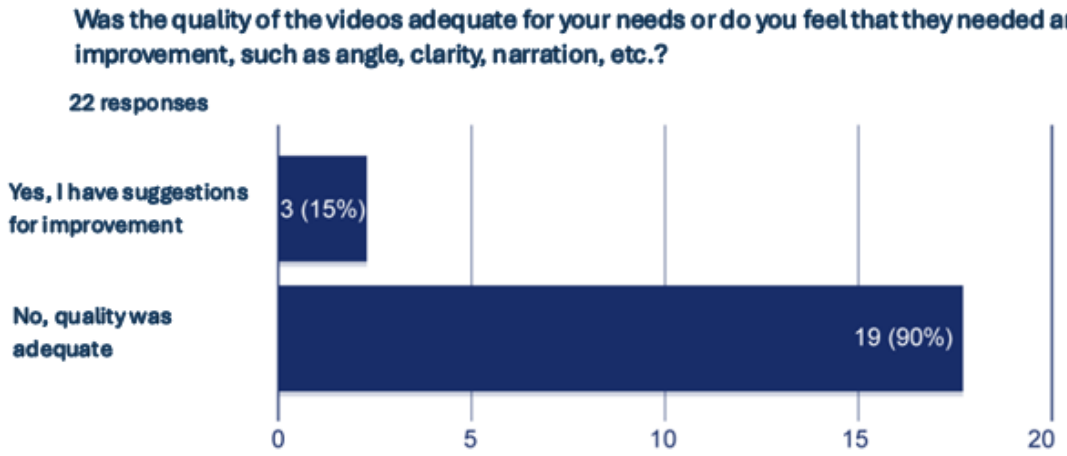
6.2.6 Video Quality

Question 12 assessed issues related to the quality of the videos. I asked the coaches if the quality of the videos was adequate or if there was something they would like to see improved. I specifically asked them about the angle, clarity, and quality of narration.

A clear majority (90%) of the coaches said that they did not see anything that required improvement and that the quality of the videos was adequate (Heikkilä M 2021, chapter 4.3). Three coaches (15%) stated that they would like to see some changes to the videos (Table 8). When a coach reported wanting to see improvements, they had the opportunity to write in suggestions. The coaches mentioned the following two suggestions for improving the videos:

-” Maybe the videos could include animations with instructions and tips for supporting practice sessions”

-” Some of the videos could have better quality.”



Graph 5.

6.3 Brainstorming Workshop with Coaches

Brainstorming workshops are a method of creative problem solving. The objective of a brainstorming session is to create novel ideas, approaches, and solutions to a specific problem under the direction of a group leader. Brainstorming sessions usually include six to twelve people (Ojansalo et.al., 2009, 160).

After the pilot program conducted in February and March, I invited the coaches to a brainstorming workshop in April of 2022. The workshop was done remotely using Google meet service with six coaches participating in the session.

In the beginning of the workshop, I explained the purpose of the PDF materials and presented the results of the pilot test covering answers to the questions briefly. I covered certain topics from the questionnaires more thoroughly. These topics were the number of videos in the library, the key exercise bank for a team vs. large video library, the look of the PDF materials, planning, and functionality of the QR-code. The remote workshop had a great mood with open discussion and sharing of ideas. The coaches were able to elaborate on the thoughts and wishes they had during the pilot test. I present the result in attachment 12. The workshop provided innovative ideas that had not been discovered through the questionnaire. We spoke for more than an hour in great dialog, where we reflected on each other’s ideas, and attempted to find better ideas to consider in further development of this product.

The participants of the workshop agreed unanimously that key exercises should be presented in a more condensed group of materials. In addition to the key exercise bank specific to a team, there should be another larger library that would allow the coaches to seek new drills and exercises, as necessary. During pilot testing, the coaches had access to two versions of the PDF materials (attachment 2 and 3). At the workshop, the visual image of a soccer field was the preferred version. The answers that I received in the questionnaire and the workshop differed in this regard (see 6.2.2). In the questionnaire a small majority preferred the version listing the exercises. Of course, this difference is likely due to the workshop including only a portion of the responders to the questionnaire.

The answers from the brainstorming session are more important for future development of the product because the group consisted of the coaches of the team that this product is intended for. During our discussion, the group created the idea and wish to have the team's key exercises covered with the visual homepage model while the larger video library should use the listing model.

We also discussed options for the visual homepage model. I presented the coaches with two designs, a soccer field (attachment 3) and a pyramid design (attachment 5). The coaches clearly preferred the soccer field design.

We also talked about the sub-pages that open when one clicks the exercise themes. According to the coaches, it was important to be able to find exercises related to the theme on the sub-page as simple as possible. Based on this conversation, we drafted the subpage design together (attachment 11). We had many ideas for the design of the subpages for the digital PDF materials (attachments 14 and 16). Some of these ideas were novel and were not previously mentioned in the questionnaire.

Several coaches stated that the QR codes for the listings were useless and only confused the user. One of the coaches thought that they could only access the materials by using a QR code. They had not realized that the URL-link below the video topics would also allow access. The feedback indicated that the QR codes did not work as intended. Another idea we discussed was that the video listing of materials could include a description of the drill below each video to give the user an immediate idea of the content of the video. Based on this conversation, I drafted the first version of the updated subpage design (attachment 7 and 9).

6.4 Interviews with Coaches and Experts

During the development project I have been discussing the process with eight coaches who participated in the questionnaire and one graphic design expert.

I based my conversations with the coaches on the questionnaire I had the coaches fill out (attachment 1). The topics of my interviews included development of key exercises for the team, ease of use of the materials, number of drills in the team's key exercise bank, and design of the subpages. These interviews allowed me to focus on specific areas and details in the development of the materials. For example, I covered the visual design and number of videos in detail with one of the coaches. These conversations revealed several issues that I will consider in the future development of this product. These topics did not come up in the questionnaires. One topic that emerged was that for each theme, the key exercise bank should include 4-8 exercises. This finding further supports my idea of updating the materials for 8 to 9-year-olds that separates key exercises based on themes with a separate PDF material that includes a much wider video library. This would support the coaches who are interested in studying the drills more closely.

My conversations with one of the coaches provided a lot of feedback that will take my development of this product forward. Their suggestions provided me with several ideas on how to develop the team's key exercise materials. They suggested a great model for splitting up the practice themes into basic skill exercises, basic team play drills, power play, and small games. Based on this feedback, I began to develop the themes. I visited this topic with several other coaches and received many novel ideas. The first drafts to the digital PDF materials for version B (with image on home page) can be found in attachment 10 (homepage) and 11 (subpage).

My discussions with the graphic design expert focused on the usability, visual design, and functionality of the site, as well as its scaling for mobile devices. This expert has assisted me a lot in technical matters and their business also builds my actual service according to my instructions. The coaches' feedback included several mentions about the sites scaling on mobile devices. The graphic designer was able to resolve this issue with the site, and the materials will be designed such that the content can be read in vertical alignment allowing better viewing on a mobile device. Any further changes making the materials mobile friendly are costly making this idea the best solution for our needs.

7 Results of the Development Project

This development project produced a development plan for improving digital PDF materials. The development plan considers the recommendations for improvement that clearly emerged in the questionnaires, interviews, and a brainstorming workshop. The objective of this development plan is to serve as a framework for further development to make the product better and even easier to use for the team's coaches. I will begin work on the improvements during the spring and summer of 2022. My goal is to have the development work done and the final version available for the team by fall of 2022.

In the following, I will introduce the four major objectives of the development plan:

1. Developing two different versions of the PDF materials for the coaches:
- Version A: the key exercises of the team sorted by themes.
- Version B: a large video library for searching a variety of practice materials
- Editing both versions to scale better on mobile devices.

2. Planning and updating the visual design of the digital PDF materials.
- Updating the home page photo and creating themes for the home page for the PDF materials containing key exercises (version A).
- Updating the homepage for the PDF materials containing the comprehensive video library (version B).
- Updating the layout of the submenu by making it easier to read.
- Adding a "see more" button below the video listing (version A).
- Removing QR codes from the video listings on the subpage.

3. Adding Video Materials
- Filming, editing, and publishing materials to support coaching the goalie.

4. Selecting Key Exercises
- With the coaches' assistance, select key exercises for the team according to their season themes.

7.1 Development of Two Different PDF Materials for Coaches

The pilot test included two different PDF materials (attachment 2 and 3). I had initially thought that I would select the materials that I would find most preferred in my development project. However, based on the interviews, brainstorming workshop, and requests from coaches, I decided to use both versions. Version B will be used to display the team's key exercise materials. The coaches supported this decision. The home page on version B includes an image with practice themes (attachment 14). Version A will be used for the comprehensive video library (attachment 13) to allow coaches access to an array of exercises. We also discovered during the development project that the site was difficult to view with a mobile device. These improvements have already been completed (attachment 15 and 16).

7.2 Designing and Updating the Look of the PDF Materials

Based on the coaches' feedback, I will be working with a graphic designer to make some changes to the look and design of the materials. These changes will make the product more user-friendly. The visual design of the home pages and the practice themes of both version A (video listing) and B (image selection) will be updated. The new design can be seen in attachments 13 and 14.

I will also update the design and themes of the subpages. The QR codes will be removed from each subpage. Several coaches mentioned that the QR codes did not work properly and are not really necessary on this page. Some of the coaches attending the brainstorming session mentioned that a brief description of each exercise could be useful under the videos. We considered making this change but decided to not make that change now. We decided to make the titles of each video larger to make them easier to read. Written description of the videos would have made the pages slightly cluttered, so we decided not to make that change. We may consider that change at a future date based on user feedback.

One coach recommended and the rest of the coaches agreed that there should be a "see more" button under each key exercise (attachment 14) to allow quick access to view other drills on the same theme.

With the assistance of the graphic designer, many of the changes we discovered during the development project will be easy to implement, although I am sure they will take time. In my opinion, the most labor-intensive part of the development will be recording and editing the materials for coaching a goalie. However, even this goal is completely possible to implement as soon as we can find a suitable time and group for recording the videos.

7.3 Adding Video Materials

The coaches were extremely satisfied with the video materials (table 8). However, the questionnaire and the brainstorming session revealed that the coaches would like materials added for coaching the goalie (see 6.2.5) My goal is to record the footage and after editing and processing it, I will be adding it to the service.

7.4 Selecting Key Exercises

According to the questionnaire, the video library was received positively. However, several coaches thought that the number of videos was excessive. With so much to select from, the key exercises and drills simply disappear in the massive amount of information (see 6.2.5). Based on this feedback, I will limit the drills in each theme to six. The coaches of PPJ will select the key exercises to most accurately match this team’s needs.

8 Discussion

This development project produced a development plan for the further improvement of digital PDF materials. The development plan has taken into consideration the suggestions brought up in questionnaires, interviews, and the brainstorming workshop. The development plan has been divided into four components: developing two sets of materials for the coaches, updating the visual design of the materials, adding more video material, and selecting key exercises.

The objective of this development project was to create a plan to update the PDF materials to make coaches' work easier, adding quality to coaching, and to save coaches' time in planning practice sessions.

The old saying," You learn to play by playing" holds true. Game situations demand that you observe, make decisions, and act quickly (Hämäläinen et.al., 2019, 596). In coaching children and the youth, it is particularly important to develop their sensory skills. Each movement contains sensory feedback and the ability to interpret sensory information. Thus, improving sensory skills improves sport performance (Hämäläinen et.al., 2019, 593). However, Mero writes that technique and skills are the key factors in sports performance. This is why practicing them should start in early childhood. Working on these factors is also important considering the early development of the nervous system (Mero, 2004, 241).

So, should we emphasize game drills or technique in coaching children? Is this topic black and white? Should focusing one eliminate the other? I feel that these two focal points are not mutually exclusive. I feel that to develop the sensory skills mentioned by Hämäläinen, various small game drills are particularly important in practice. Many athletic and sport specific skills will develop simultaneously while playing these types of small game drills (Mero, 2004, 241). Drills involving one-on-one situations develop the players ability to observe in addition to developing dribbling, passing, feinting, and general athletic abilities including rhythm, agility, and balance. Certainly, sport specific skills training also requires a lot of repetitions to further develop the skill. Plyers should do these repetitions on skills primarily independently outside of team practice. However, some time should be dedicated to skills during practice. The final phase of skill acquisition, where the movements are automatic takes about 10,000 hours of practice (Ericsson, 1996; Jaakkola, 2010, 66-67). This emphasizes the incredible amount of work required for an athlete to reach the final stage of skill acquisition, where the movements are automatic (Wulf, 2007; Jaakkola, 2010, 66).

The digital PDF materials used in this development project include a comprehensive amount of small game drills designed to develop sensory abilities and decision making in 8 to 9-year-old players. These videos will make it easier for the coaches to identify key factors and how to implement

these drills. Additionally, this material includes a comprehensive exercise bank that can be used in practice and independent training. One coach in the questionnaire nailed it by saying," Being able to visualize the drill and see it in action in planning phases makes me understand the practice theme better. I am certain it is also useful in going over drills and their key points with the players from time to time." The videos are easily accessible and grouped based on level of difficulty from easiest to most difficult to make finding the best drills easy and simple.

In their article, Sarajärvi discusses the ecological dynamics model. According to them, when using the ecological dynamics model, the player does not have to place their supporting leg in the exact same position every time, when making a push pass. Rather, the player should have the ability to pass even if the supporting leg is in an unusual position. In real game scenarios the supporting foot will land in various positions (Sarajärvi, 2015). It is quite clear that in fast game situations the player does not have a chance to always place their foot perfectly in relation to the ball and the player must be able to adjust quickly. How a player resolves a fast game situation is important, not whether the supporting leg is placed ideally. Various small game drills are particularly useful in developing this skill. Observation and action are central in the ecological dynamics model. These two factors are not separated from each other, further emphasizing the usefulness of small game play in developing this skills according to this model. Small games require the players to observe situations, the placement of the defensive line and the movements of their teammates.

Kalaja mentions in their blog that differential learning is based on variations in the target performance. Varying the type of practice impacts the formation of connections in the nerve pathways in the brain. This network supports the performance of more difficult skills. On the other hand, Professor Keith Davis has stated that successful and talented athletes' target performance is often based on late specialization in a specific sport. This means that in childhood and youth, training should have variety and the athletes should participate in multiple sports (Kalaja, 2015). We can also certainly say that a variety of activities has a positive impact on later success of an athlete. Nowadays, athletes are too quick to select a favorite sport and stop all other training too early. In other words, it is very important to participate in a variety of sports early in life and specialize in one sport later. Considering the key factors of differential learning, it is a good idea to consider how to maximize skill development. Kalaja mentions in their blog that differential learning is based on variation in target performance and that this variation provides the learner feedback on their performance (Kalaja, 2015). Based on this information, we can say that it is important to include variety in between movements. We cannot just practice specific sets of movements over and over. It is more effective to vary movements to maximize transference in learning skills. Also staggering difficulty level of movement series with increasing difficulty is beneficial. Effectiveness in skills training is increased with more variability and variety.

Next, I will discuss the benefits of using video materials in learning. Video materials are beneficial in teaching, and they are considered a strong alternative to written materials. Videos can maintain a student's attention better. Viewing a video shows clearly what works and what does not. Often a viewer can understand something in theory but seeing the performance on video helps them connect the information to what they are seeing. Learning is a process where new information is connected to existing information. Videos make it easier to identify the key factors in the material the student is learning (Sartjärvi, 2014, 11). Many of the coaches in my interviews shared this view and found the videos to be beneficial in their coaching. One of the coaches stated, "For example, you can use the topics to find a good drill for a specific theme. By checking the experience level, you can select a good drill for your group. By watching the video a few times, one can really comprehend and remember it." Good digital materials can enhance planning and increase the effectiveness of training. The coaches can better understand the content and goals of each drill. These factors play a direct role in the athletes' learning and development.

Nielsen (2000, 8-9) states in their book that useability is the key factor in website development. The user should be able to master the function of a page within a minute of entering the site or otherwise they perceive themselves to be wasting time (Nielsen, 2000, 8-9). Useability refers to how easy the website is to use. Viljanen (2020) states in their article that a website with good useability is easy, smooth, and error free. While it is not the only factor, user experience has a significant impact on the success of a product. My development project showed that my materials have good useability. Many of the coaches found the materials easy to use. One of the users stated," Easiest and best way that I have bumped into." To improve the quality of user experience, feedback questionnaires should be sent to collect data on how well the site is working and to collect suggestions for improvement. A product should be redeveloped and updated from time to time. It is good to publish a product as fast as possible to collect feedback about useability. Often online products are under work and perfected for too long. By collecting user experience, the product can be developed further faster.

It made sense to use process analysis as the method for this development project. Process analysis is used to create new information and to solve problems. Process analysis should engage individuals who are a part of the community and involve them in the development (Ojansalo et. al., 2020, 58). In this development project I recruited the team's coaching staff, who shared their thoughts and ideas for improvement in my work. Because development through involvement is important in process analysis, we sought to collaborate with the coaches to find ideas for improving and developing the materials so that the products would better serve the target audience, the coaching staff of the team. Solutions that are created within the team are generally better than ideas that are handed down from management. The phases in process analysis; planning,

observations, and assessment, are a cycle that can be repeated several times. Thus, process analysis is cyclical in nature. (Ojansalo et.al., 2020 59). In my study, the development work was done cyclically with the end-product being a development plan that was created in cooperation with the intended users of the product, the coaches.

The next phase of this project will be the implementation of the development plan, followed by sharing the final product with the coaches. At that point, it will be time for a second assessment and feedback cycle from the users to evaluate the success of our work and further improvement plan depending on the feedback. These phases will no longer be a part of my master's project. I will complete them after completing my studies. I believe that thanks to this master's project, the coaches will gain a new tool that will improve their coaching success. This product will increase the variety of drills and understanding of the key factors of each drill. My goal is to complete the improvements during this summer with the final product available to the coaches after that. I am extremely interested in seeing how the coaches will use the product and what feedback I will receive. I do not yet know how useful this updated PDF material will be or the benefits it will have for effective training. I am sure that I will receive results of the effectiveness and usefulness by the beginning of next year once the coaches have had more time to use it and they have had a chance to provide feedback on its benefits and ideas for improvement. I currently have a strong interest in further developing this product. Because of the increased excitement and encouragement that I have received thanks to this project, I am sure that I will have interest in continuing to develop this product.

Life has changed with the spread of technological devices and development in technology. According to a study sponsored by Statistics Finland (2020), 92% of 16 to 89-year-olds use the internet (Tilastokeskus, 2020). Video services, such as YouTube and Vimeo are familiar to youth and adults and on average 94.5% of 16 to 54-year-olds have used these video services (Tilastokeskus, 2021a). It is easy to see that technological development will also affect coaching sports. These data by Statistics Finland support the idea that digital coaching tools are a part of today's coaching, and this impact is expected to increase in the future. Personally, this raises a question about my own MSA project. I wonder when I first published the service eight years ago, if I was ahead of my time with it or if the results indicated that the product did not include enough value added to coaching. I believe that both factors played a part.

In this development plan I asked the coaches (question 7, see attachment 1) if they felt that access to a digital video library would be beneficial to them. The results show that all the coaches (100%) felt that digital materials would be beneficial. This result further highlights the benefit of digital materials in coaching.

I designed and implemented the updated page layouts for the digital PDF materials with an expert in the field. In the questionnaire I asked the coaches for ideas for improving the digital PDF materials (see 6.2.5). The suggestions included, among others, that the materials were difficult to view with a mobile device. Based on this suggestion we updated the materials to allow easier viewing on the phone.

In the beginning of the project, one's ideas about what the project can lead to can be hazy. This is what happened to me in the process of this work. Not until the end did I realize that the updated pages could be used also to build the updated website for MSA. The planning for the updates to the entire site was an accidental byproduct of this development plan. It is thus possible that the new updated PDF materials will be utilized to also develop a new website.

In the questionnaire I asked the coaches to assess the ease of use and functionality of the PDF materials (see 6.2.4). A clear majority of the coaches commented that the materials were easy or very easy to use. This solidified my belief that my work can be expanded to cover more age groups. What may end up happening in this case, maybe similar to what happened in 2006 when I graduated from Lahti University of Applied Sciences with a degree in physical education. My final project in 2006 ended up being the beginning of what later became Mobile Soccer Academy. This product gained users both in Finland and abroad. This 2022 master's project may end up being another jump into the unknown for me. As the aphorism states, "The best way to predict the future is to create it."

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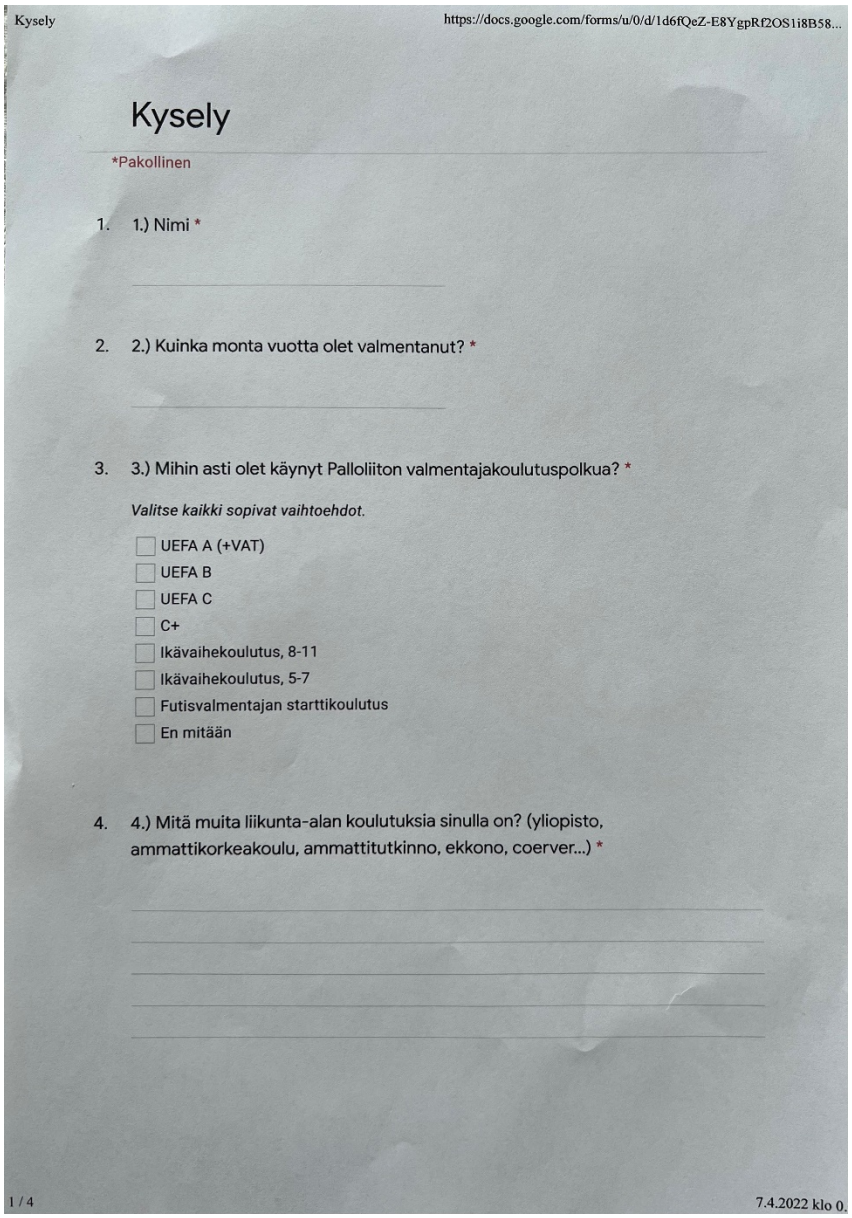
Appendix

Attachment 1 - questionnaire (four pages)



Kysely

*Pakollinen

1. 1.) Nimi *

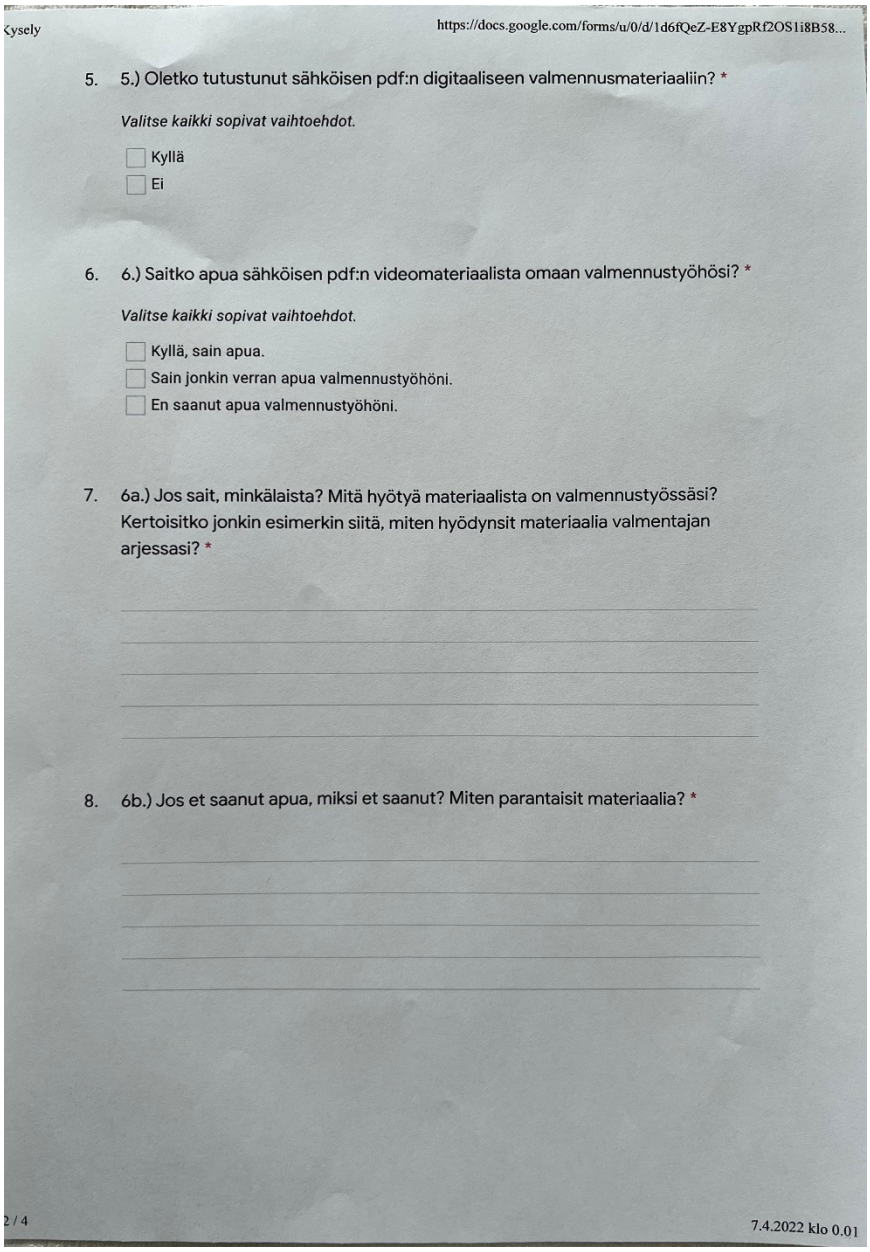
2. 2.) Kuinka monta vuotta olet valmentanut? *

3. 3.) Mihin asti olet käynyt Palloliiton valmentajakoulutuspolkua? *

Valitse kaikki sopivat vaihtoehdot.

- [ ] UEFA A (+VAT)
- [ ] UEFA B
- [ ] UEFA C
- [ ] C+
- [ ] Ikävaihekoulutus, 8-11
- [ ] Ikävaihekoulutus, 5-7
- [ ] Futisvalmentajan starttikoulutus
- [ ] En mitään

4. 4.) Mitä muita liikunta-alan koulutuksia sinulla on? (yliopisto, ammattikorkeakoulu, ammattitutkinno, ekkono, coerver...) *



5. 5.) Oletko tutustunut sähköisen pdf:n digitaaliseen valmennusmateriaaliin? *

Valitse kaikki sopivat vaihtoehdot.

- [ ] Kyllä
- [ ] Ei

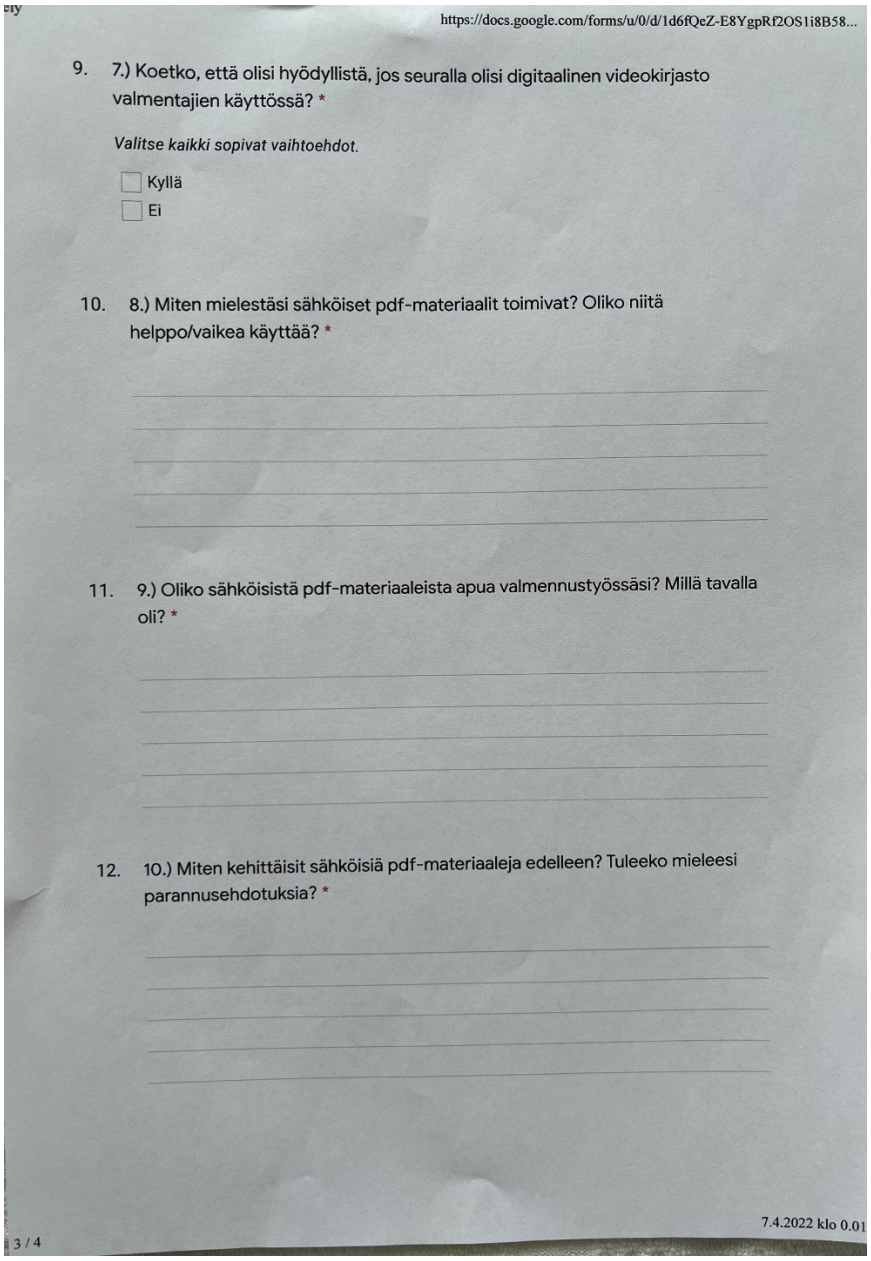
6. 6.) Saitko apua sähköisen pdf:n videomateriaalista omaan valmennustyöhösi? *

Valitse kaikki sopivat vaihtoehdot.

- [ ] Kyllä, sain apua.
- [ ] Sain jonkin verran apua valmennustyöhöni.
- [ ] En saanut apua valmennustyöhöni.

7. 6a.) Jos sait, minkälaista? Mitä hyötyä materiaalista on valmennustyössäsi? Kertoisitko jonkin esimerkin siitä, miten hyödynsit materiaalia valmentajan arjessasi? *

8. 6b.) Jos et saanut apua, miksi et saanut? Miten parantaisit materiaalia? *



9. 7.) Koetko, että olisi hyödyllistä, jos seuralla olisi digitaalinen videokirjasto valmentajien käyttössä? *

Valitse kaikki sopivat vaihtoehdot.

- [ ] Kyllä
- [ ] Ei

10. 8.) Miten mielestäsi sähköiset pdf-materiaalit toimivat? Oliko niitä helppo/vaikea käyttää? *

11. 9.) Oliko sähköisistä pdf-materiaaleista apua valmennustyössäsi? Millä tavalla oli? *

12. 10.) Miten kehittäisit sähköisiä pdf-materiaaleja edelleen? Tuleeko mieleesi parannusehdotuksia? *

13. 11.) Sait käyttöösi kaksi eri vaihtoehtoa pdf-materiaaleista A ja B. Kumpi vaihtoehdoista oli mielestäsi toimivampi ja miksi? Kirjoita kohtaan "Muu" mikä teki valitsemastasi vaihtoehdosta paremman? *

Valitse kaikki sopivat vaihtoehdot.

- [ ] A-versio (videolistaukset)
- [ ] B-versio (havannoilliset kuvat)
- [ ] Muu: _____

14. 12.) Kaipaisitko videoiden laatuun jotain lisää vai riittikö laatu tarpeisiisi? Esim. kuvakulma, tarkkuus, selostuksen laatu jne. *

Valitse kaikki sopivat vaihtoehdot.

- [ ] Kyllä, kaipaisin videoihin lisää ominaisuuksia.
- [ ] En kaipaa mitään lisää/laatu riitti minulle.

15. 12a.) Jos vastasit kohtaan 12 "Kyllä kaipaisin videoihin lisää ominaisuuksia", minkälaisia?

_____

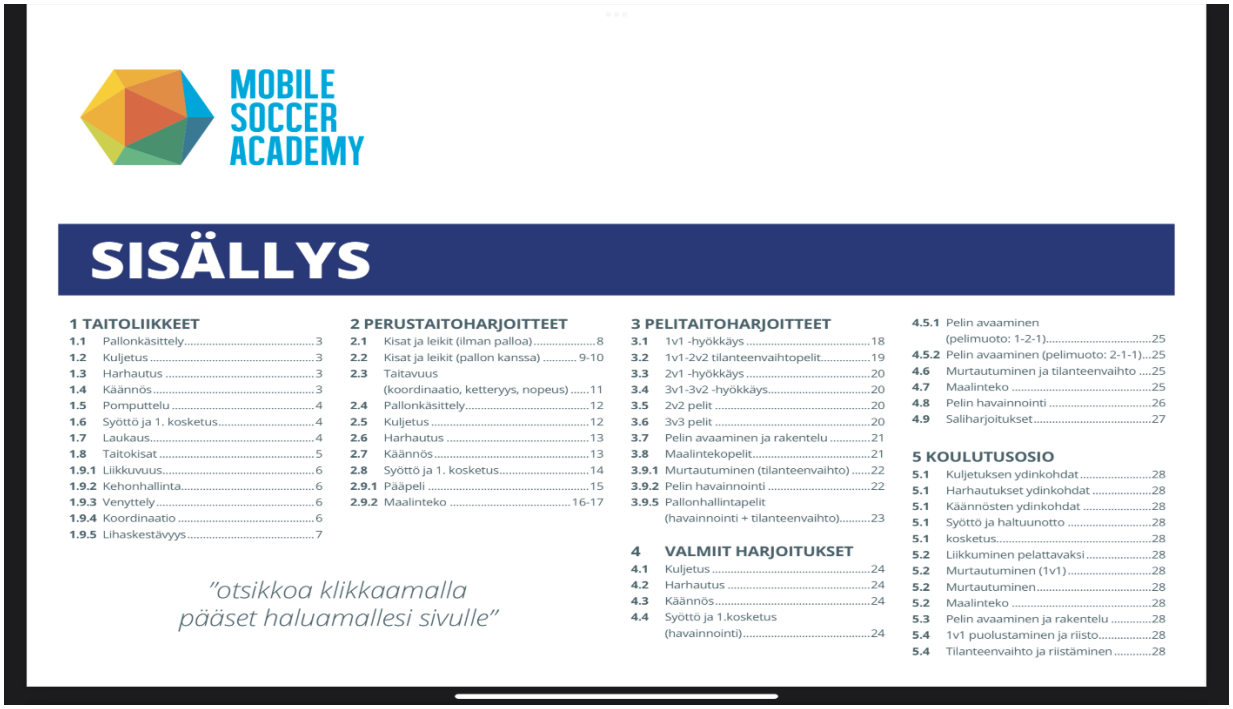
_____

_____

_____

_____

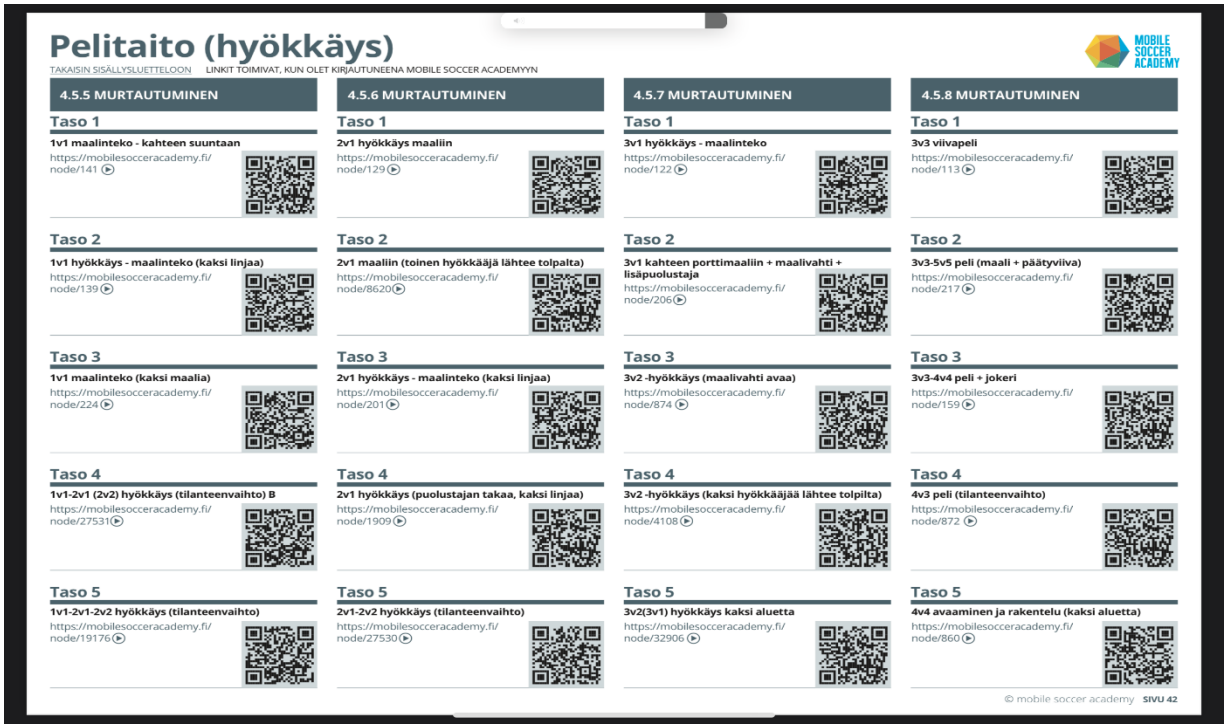
Attachment 2 – Home page and drop-down menu for digital PDF materials (Version A, listing of videos)



MOBILE SOCCER ACADEMY

SISÄLLYS

"otsikkoa klikkaamalla pääset haluamallesi sivulle"



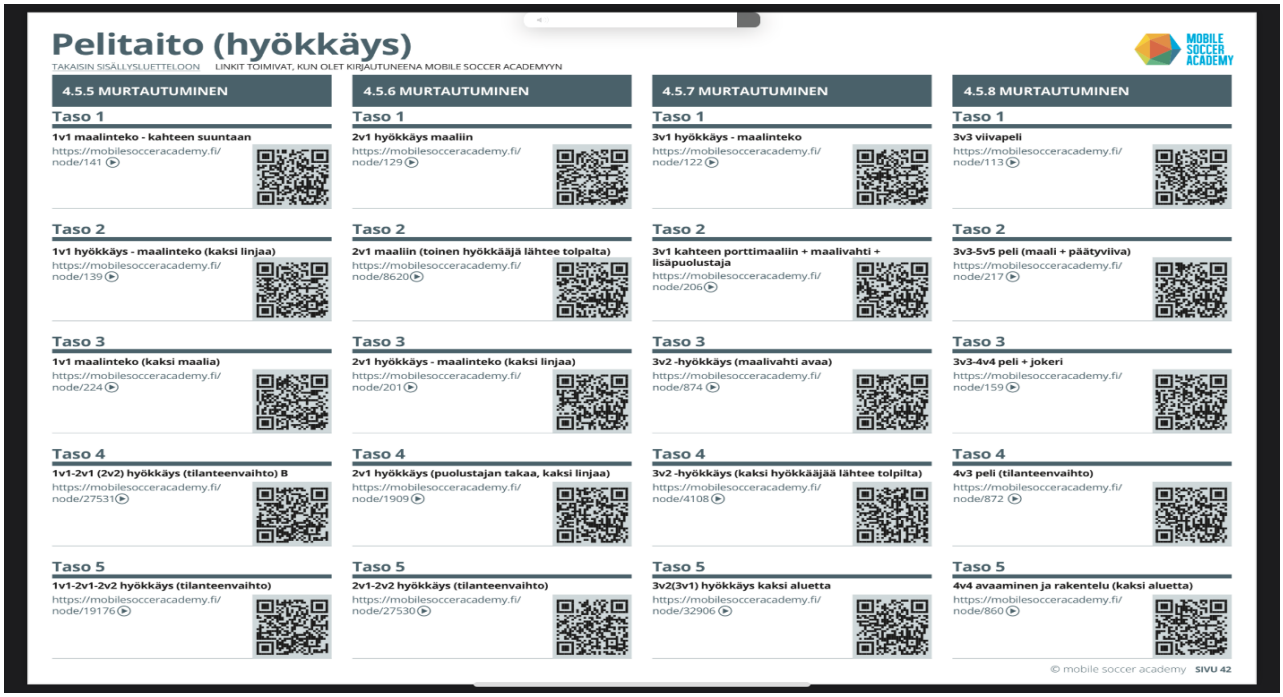
Pelitaito (hyökkäys)

TAKAISIN SISÄLLYSLUETTELOON LINKIT TOIMIVAT, KUN OLET KIRJAUTUNEENA MOBILE SOCCER ACADEMYYN

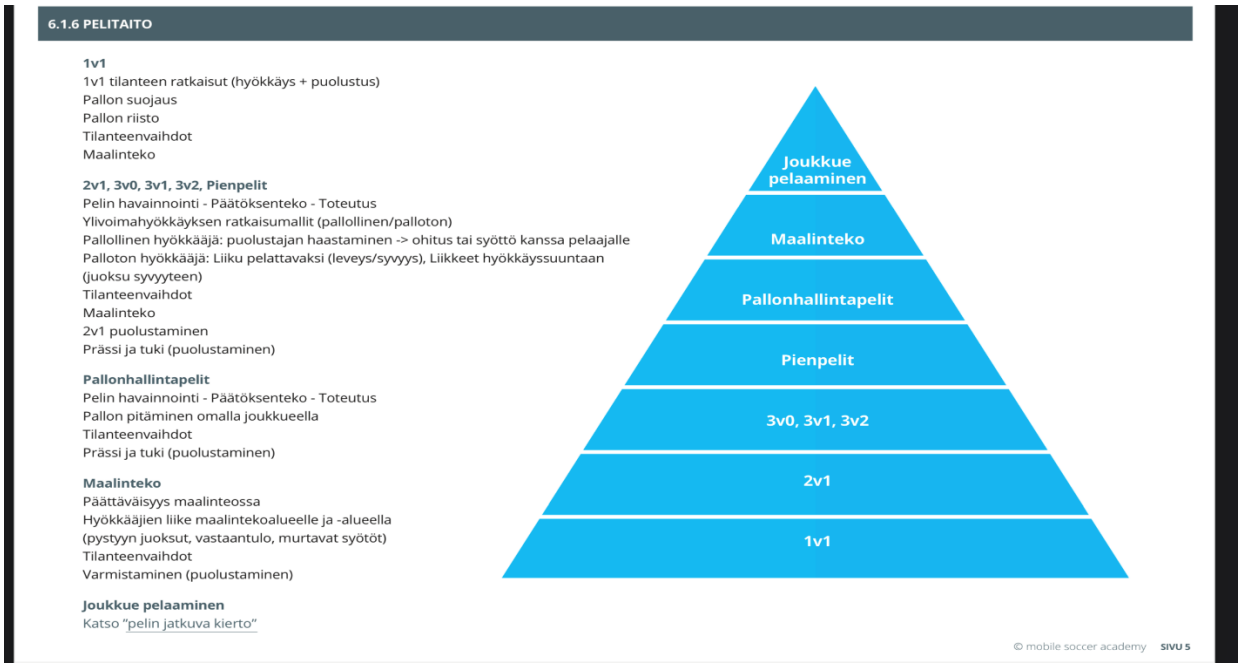
MOBILE SOCCER ACADEMY

4.5.5 MURTAUTUMINEN	4.5.6 MURTAUTUMINEN	4.5.7 MURTAUTUMINEN	4.5.8 MURTAUTUMINEN
Taso 1 1v1 maalinteko - kahteen suuntaan https://mobilesocceracademy.fi/node/141	**Taso 1** 2v1 hyökkäys maaliin https://mobilesocceracademy.fi/node/129	**Taso 1** 3v1 hyökkäys - maalinteko https://mobilesocceracademy.fi/node/122	**Taso 1** 3v3 viivapeli https://mobilesocceracademy.fi/node/113
Taso 2 1v1 hyökkäys - maalinteko (kaksi linjaa) https://mobilesocceracademy.fi/node/139	**Taso 2** 2v1 maaliin (toinen hyökkääjä lähtee tolpalta) https://mobilesocceracademy.fi/node/8620	**Taso 2** 3v1 kahteen porttimaaliin + maalivahti + lisäpuolustaja https://mobilesocceracademy.fi/node/206	**Taso 2** 3v3-5v5 peli (maali + päätyviiva) https://mobilesocceracademy.fi/node/217
Taso 3 1v1 maalinteko (kaksi maalia) https://mobilesocceracademy.fi/node/224	**Taso 3** 2v1 hyökkäys - maalinteko (kaksi linjaa) https://mobilesocceracademy.fi/node/201	**Taso 3** 3v2 -hyökkäys (maalivahti avaa) https://mobilesocceracademy.fi/node/874	**Taso 3** 3v3-4v4 peli + jokeri https://mobilesocceracademy.fi/node/159
Taso 4 1v1-2v1 (2v2) hyökkäys (tilanteenvaihto) B https://mobilesocceracademy.fi/node/27531	**Taso 4** 2v1 hyökkäys (puolustajan takaa, kaksi linjaa) https://mobilesocceracademy.fi/node/1909	**Taso 4** 3v2 -hyökkäys (kaksi hyökkääjää lähtee tolpilta) https://mobilesocceracademy.fi/node/4108	**Taso 4** 4v3 peli (tilanteenvaihto) https://mobilesocceracademy.fi/node/872
Taso 5 1v1-2v1-2v2 hyökkäys (tilanteenvaihto) https://mobilesocceracademy.fi/node/19176	**Taso 5** 2v1-2v2 hyökkäys (tilanteenvaihto) https://mobilesocceracademy.fi/node/27530	**Taso 5** 3v2(3v1) hyökkäys kaksi aluetta https://mobilesocceracademy.fi/node/32906	**Taso 5** 4v4 avaaminen ja rakentelu (kaksi aluetta) https://mobilesocceracademy.fi/node/860

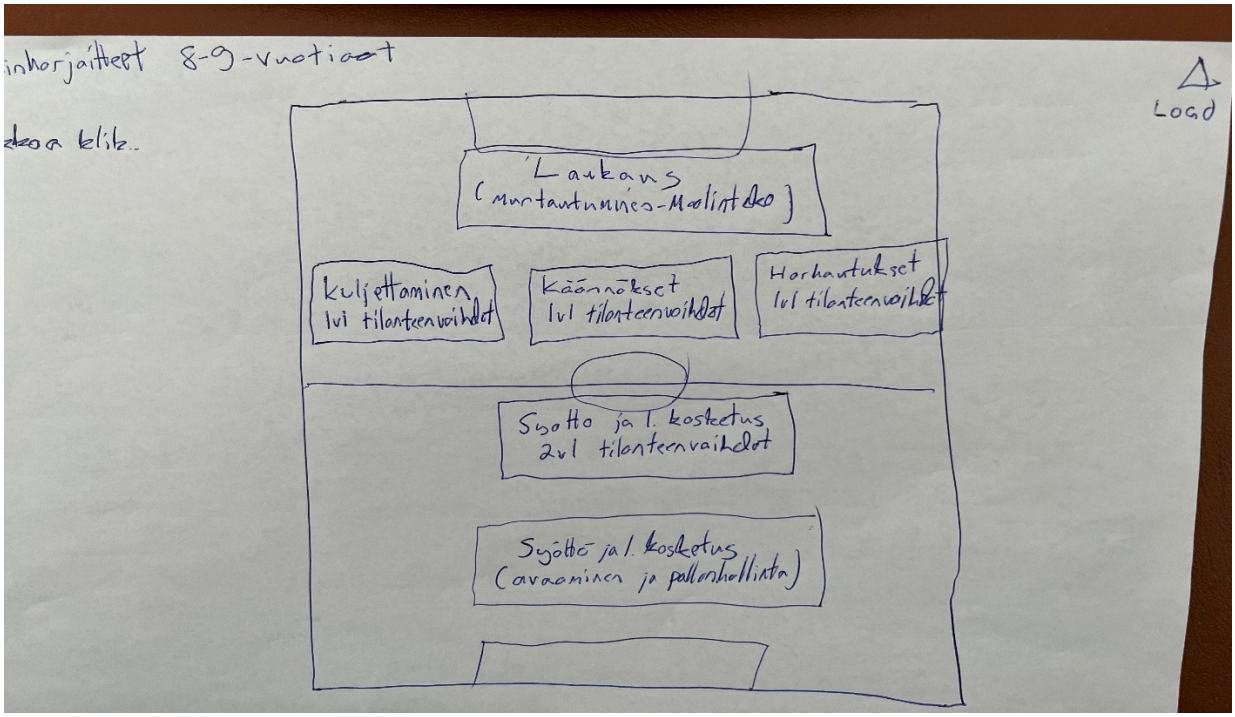
Attachment 3 – Home page and drop-down menu for digital PDF materials (Version B, selection from image)



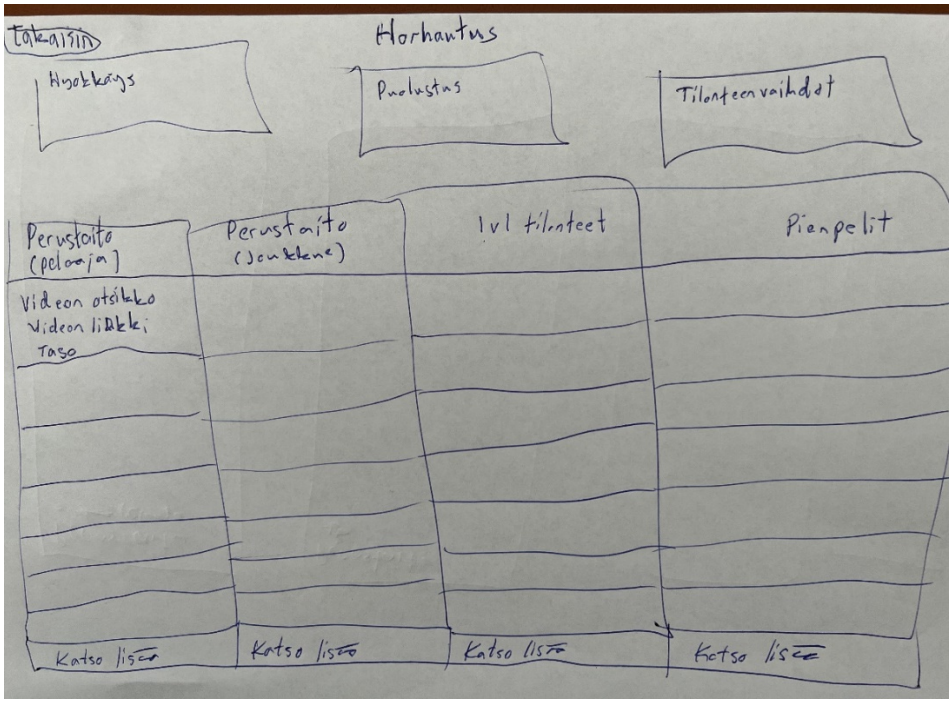
Attachment 5 – Pyramid model – alternate homepage model



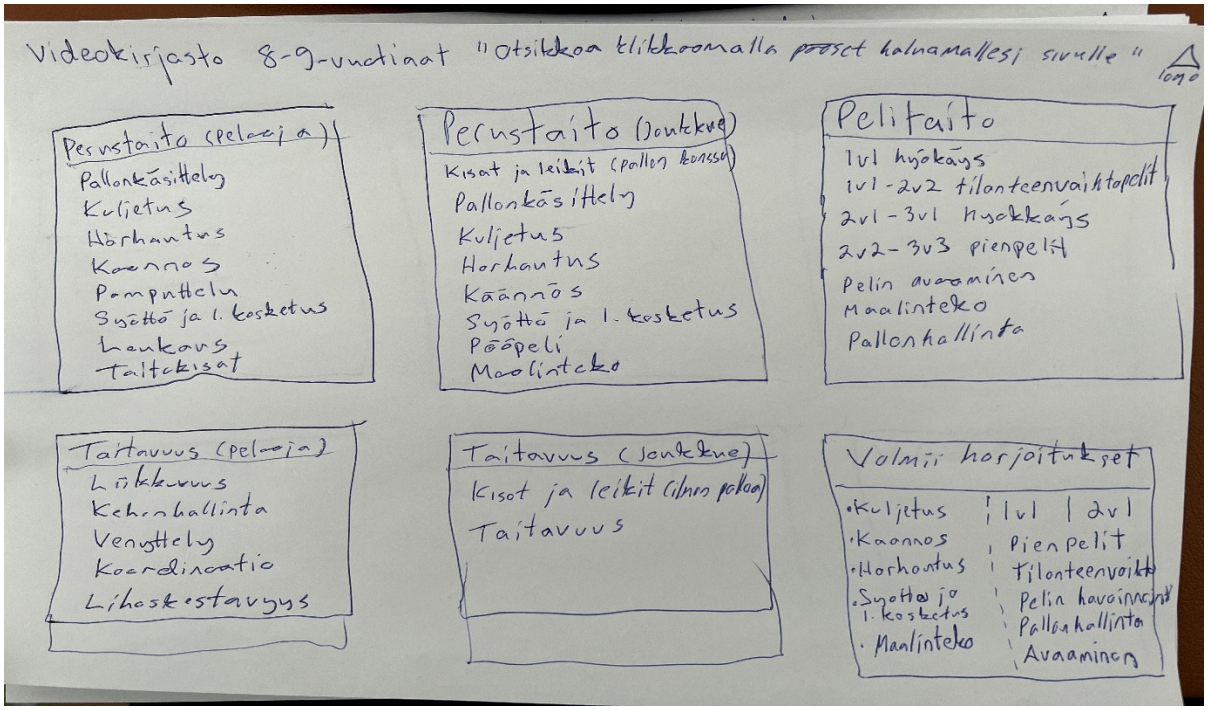
Liite 6 – Updated image for digital PDF materials (Version B)



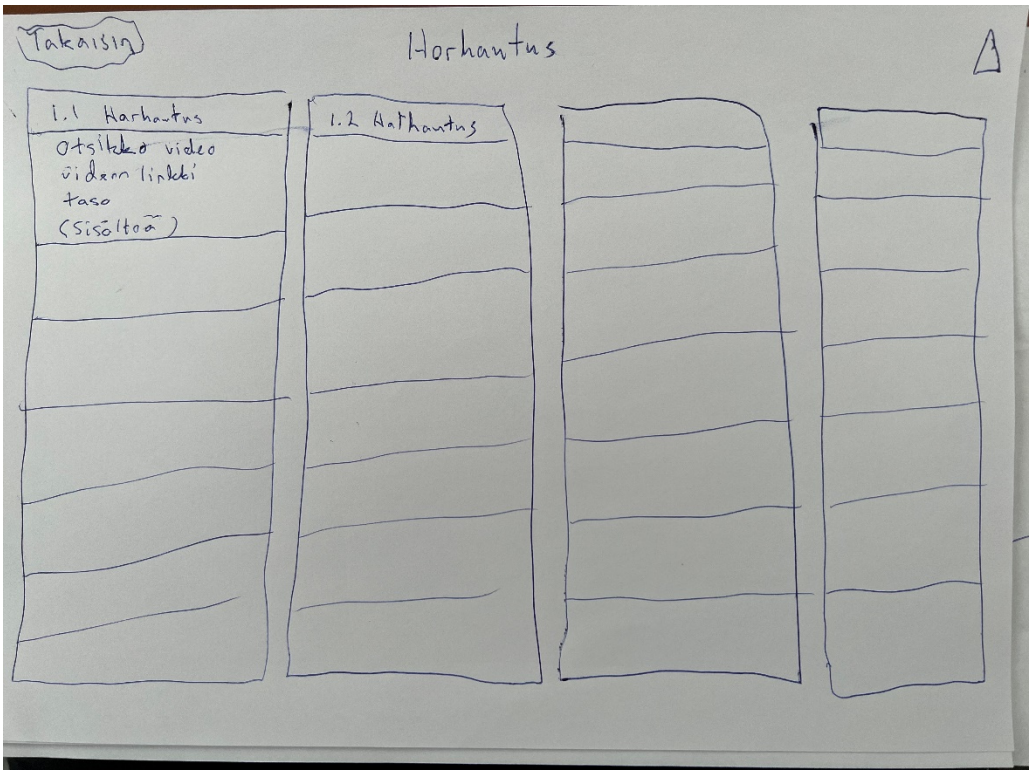
Attachment 7 – Updated image for drop-down menu for digital PDF materials (Version B)



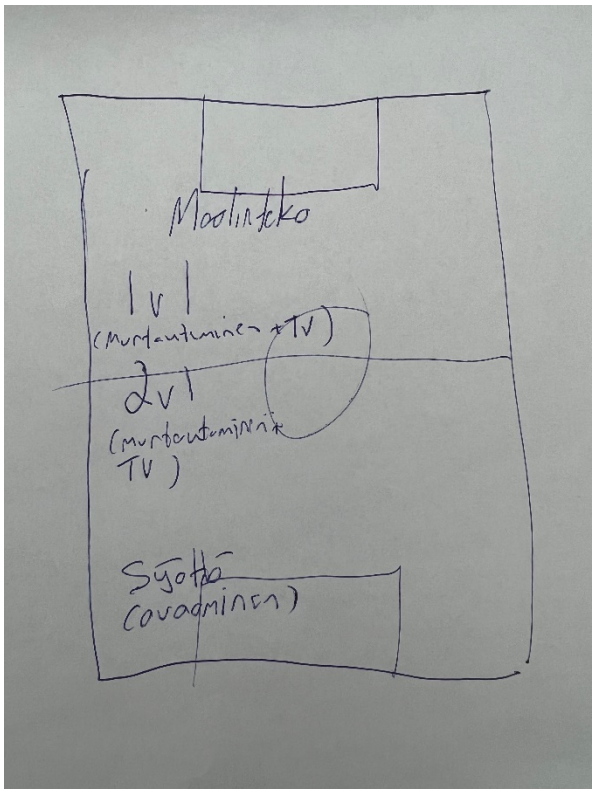
Attachment 8 – Updated version of listed dropdown menu for digital PDF materials (Version A)

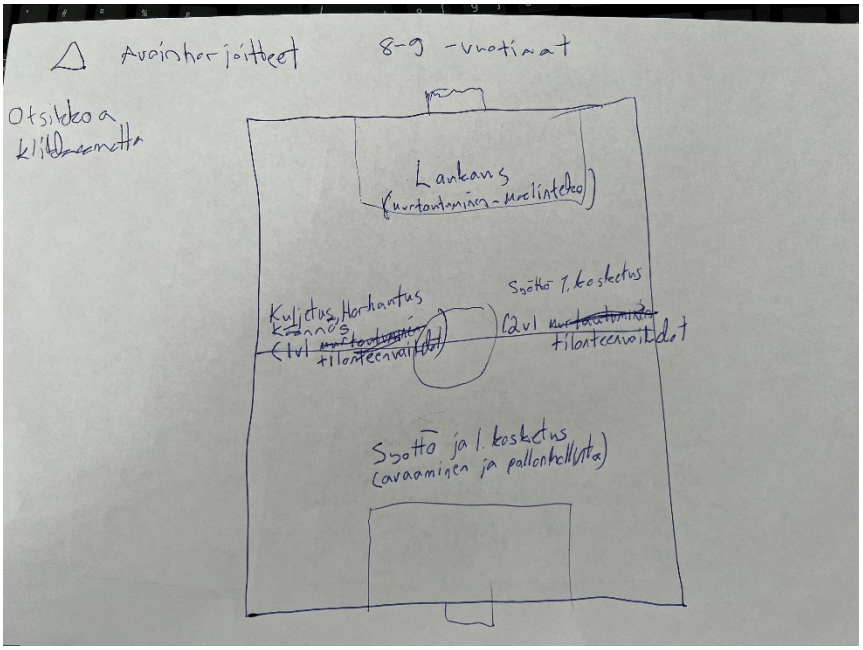


Attachment 9 – Updated version of listed drop-down menu sub-page (Version A)

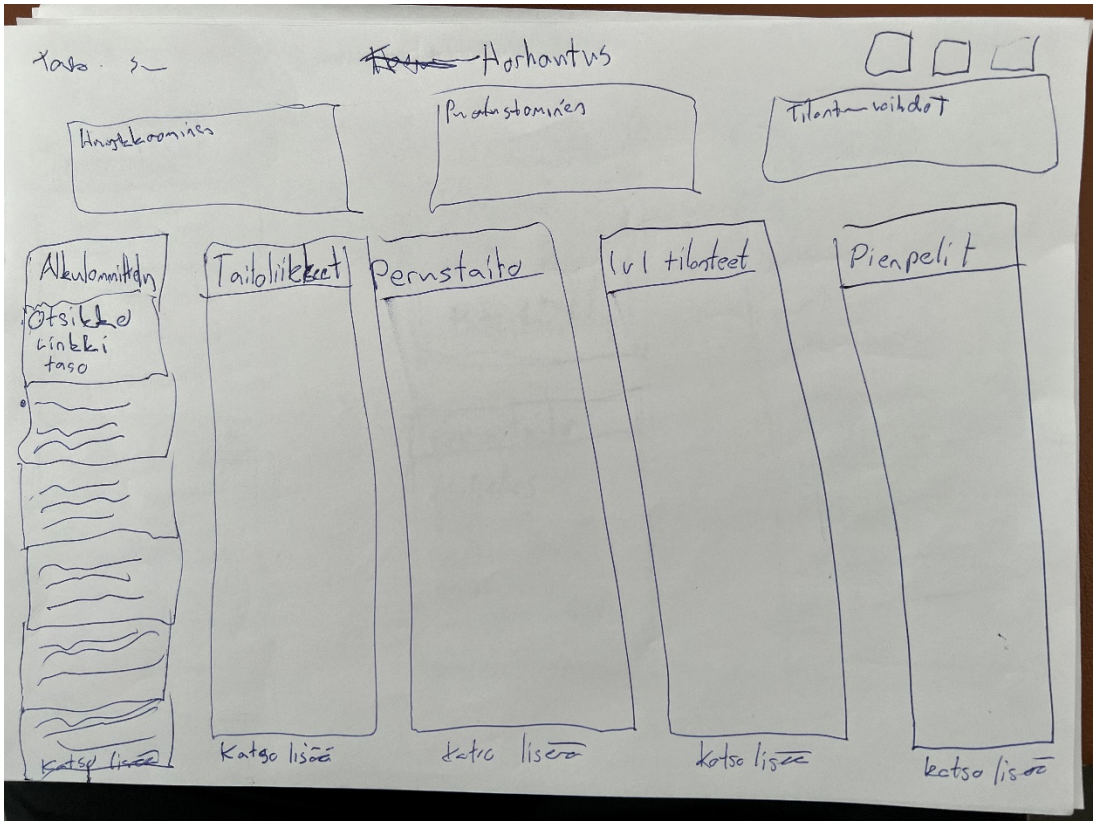


Attachment 10 – Two first drafts for the homepage for the digital PDF materials (Version B)

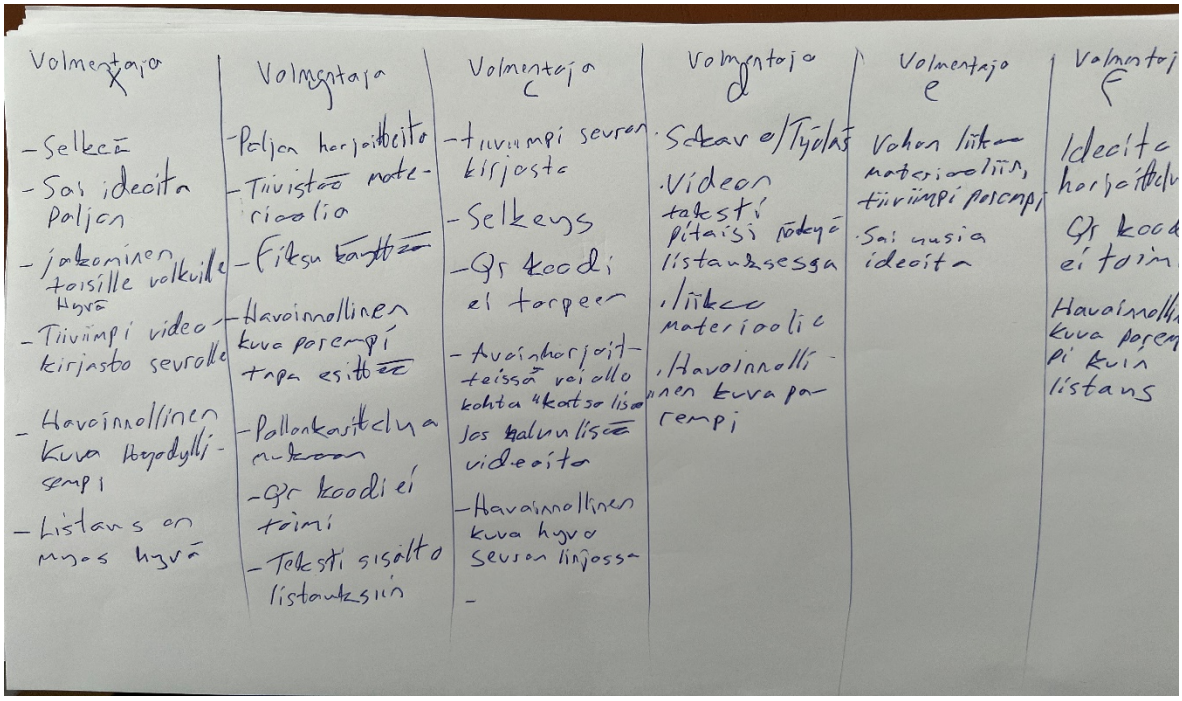




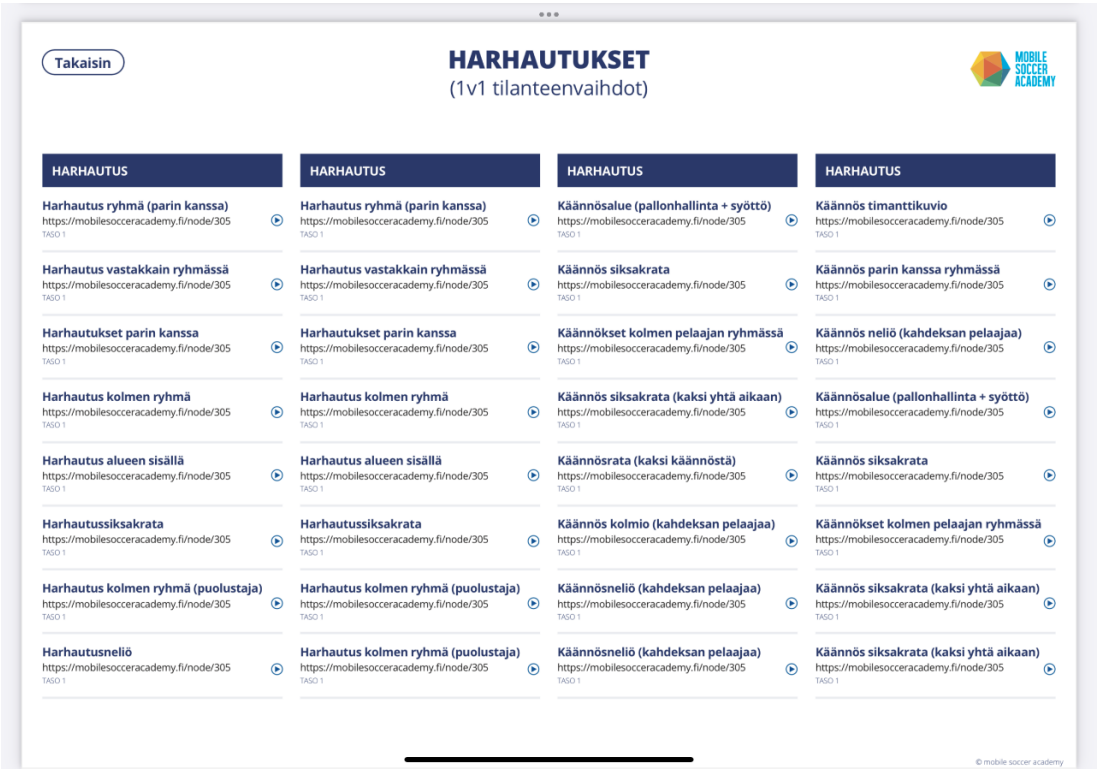
Attachment 11 – First draft of the drop-down menu for the digital PDF materials (Version B)



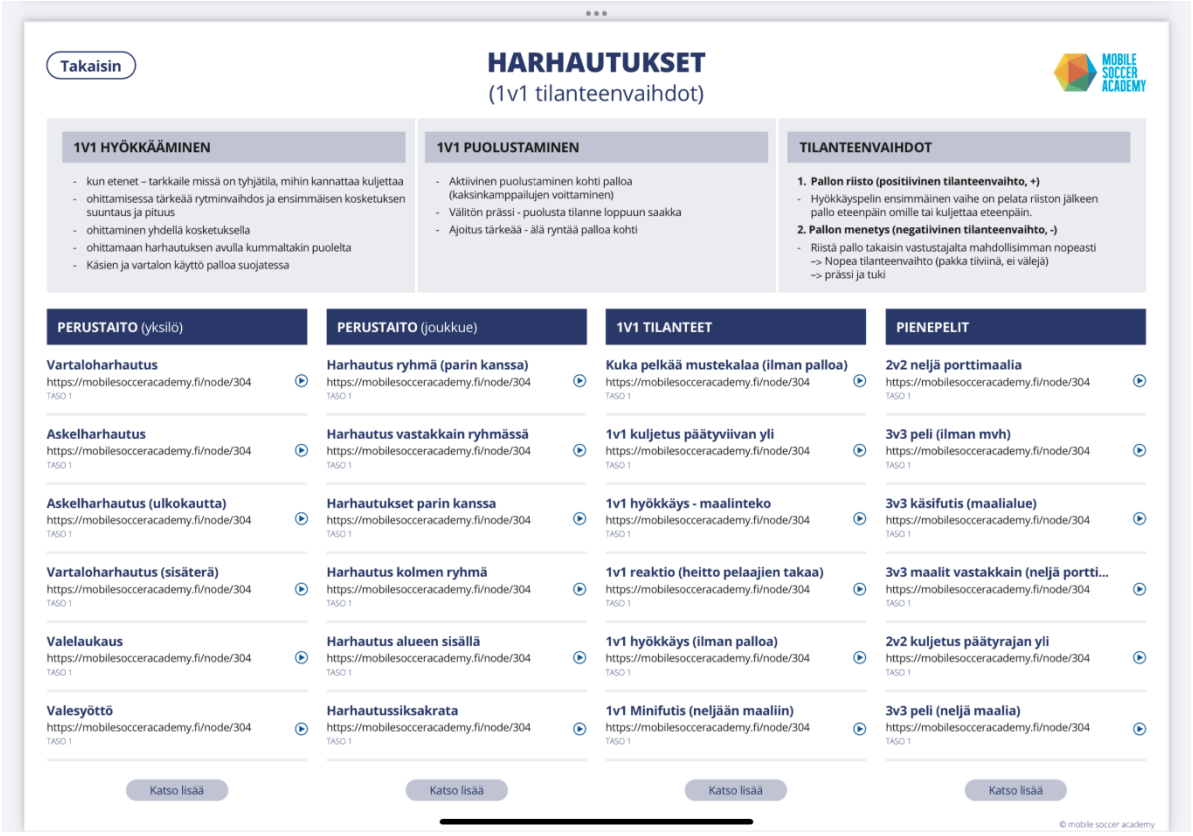
Attachment 12 –Notes from the brainstorming workshop



Attachement 13 – Updated homepage for the digital PDF materials (above) and subpage (image below; Version A)



Attachment 14 – Updated homepage (top image) and drop-down menu (below image; Version B)



Attachment 15 –Mobile device screen shot of the updated homepage (on the left) and drop-down menu (on the right) for the digital PDF materials (Version A)

Attachment 16 – Mobile device screen shot of the updated homepage for the digital PDF materials (on the left) and the sub-page (on the right; Versio B)