

SAJMMR

ISSN (online) : 2249-877X

South Asian Journal of Marketing & Management Research



Published by
South Asian Academic Research Journals
A Publication of CDL College of Education, Jagadhri
(Affiliated to Kurukshetra University, Kurukshetra, India)

Editor-in-Chief : Dr. Dalbir Singh

Impact Factor : SJIF 2021 = 7.642

Frequency : Monthly

Country : India

Language : English

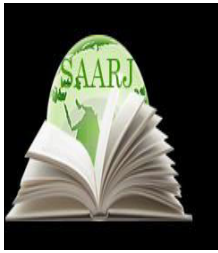
Start Year : 2011

Indexed/ Abstracted : Scientific Journal Impact Factor(SJIF 2020 - 7.11), Google Scholar, CNKI Scholar, EBSCO Discovery, Summon(ProQuest), ISC IRAN, Primo and Primo Central, I2OR, ESJI, IJIF, DRJI, Indian Science and ISRA-JIF.

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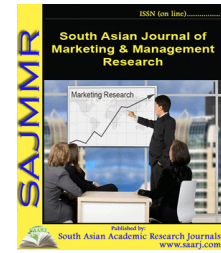
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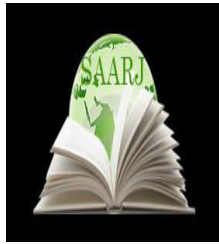


South Asian Journal of Marketing & Management Research (SAJMMR)

(Double Blind Refereed & Peer Reviewed International Journal)

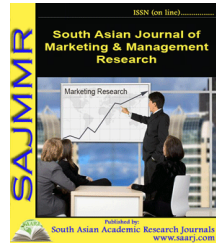


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South Asian Journal of Marketing & Management Research (SAJMMR)

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DOI: **10.5958/2249-877X.2021.00051.5**

MANAGEMENT OF STRESS THROUGH MUSIC THERAPY

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ABSTRACT

Stress management techniques involve a number of ways, with music playing an important role in the process. These techniques might be based, among other things, on biological and psychological stresses. Stress is evaluated for changes in some physiological parameters such as finger temperature, heart velocity, and blood pressure during study on these processes; modifications that influence immunological and neuroendocrine responses are also sought for. Music has long been used to soothe individuals, and much research is being conducted to determine how different forms of music may be used to manage stress. Surprisingly, some of these studies show that 'classical' music had a greater influence on stress than popular 'New Age' music, despite the fact that both are popular. Many kids use music to cope with stress, and teachers may want to consider incorporating more music into their classroom to help students study more successfully. This study provides an overview of current studies on the use of music to assist people in dealing with stressful situations.

KEYWORDS: *Music, Stress, Managing stress through Music, effects on emotions, Physical and psychological effects.*

INTRODUCTION:

A physical and psychological response generated by an individual when the difference between reality and imagination becomes intolerable is characterized as stress. This state is tolerable if it lasts for a short period of time; however, if it is prolonged or excessively present and has the potential to grow into escapist or withdrawal behavior, it must be handled (Merriam-Medical Webster's Desk Dictionary, 2005). Because technology evolves at such a quick rate, life becomes

more hectic by the day. In this environment, a rising number of people are suffering and failing to deal with heightened stress.

The stress reaction is driven by a substantial difference between (actual or imagined) reality and expectations. Even if a person lives in a way that meets personal standards, he or she is not stressed, even though the conditions are seen as difficult by those outside the family. Few people are happy with their existing status in today's fast-paced culture. Anxiety, hostility, weariness, wrath, pain, desperation, overwork, pre-menstrual tension, overconcentration, bewilderment, weeping, and dread are among stressors that impact the human brain (The American Heritage Stedman's Medical Dictionary). Individuals who are stressed use a number of methods, including medicine, relaxation techniques such as yoga, group activities such as sports, community activities, and others. Individuals may complement these therapies with potentially dangerous behaviors such as drinking, smoking, and taking narcotic medicines, which can have long-term repercussions.

In their search for new ways to cope with stress, researchers investigated the use of 'music' as a stress management aid and finding that it was beneficial. Music has the capacity to release stress and calm an individual on both a psychological and physical level, with neither short- or long-term negative consequences. Music, with its wide range of study and development, along with stress management, is a challenging and interesting subject to learn and master. This study discusses how biological parameters such as finger temperature, heart rate, blood pressure, muscular contraction, and galvanic skin response vary when a person is stressed. These physical properties, which may be measured directly or indirectly, reflect the amount of stress that fluctuates proportionally with temperature change. It is examined if they are useful as a stress measurement tool and what sort of music was utilised in the testing. The reasons behind the music chosen will be considered. Classical, new age, and popular music are all words used to define different musical genres.

The comparison and analysis of the various techniques will yield ideas for future research.

1. Physiological and psychological change:

The 'autonomous' nervous system is thought to be a component of the human body that is not under the conscious control of the individual who has it. Friendly and parasympathetic characteristics, both hostile in nature, are further classified into two types. When a person is stressed, sympathetic nerve output controls and boosts blood flow to major muscles, preparing the body for an assault or escape (fight or flight). Dry mouth, motor excitation, sweating, pallor, enlarged pupils, and sleeplessness are all noted physiologically.

A number of hormonal and physiological changes occur in your body, including increased heart rate, adrenalin surge into the bloodstream, temporary digestion, and immune system shutdown (due to a reduction in immune-promoting hormones) (Lewis, 2000). The next sections go through the different physiological reactions and changes that occur when music is utilised as a stress-reduction method.

2. The heart's rate of beat:

The term "heart rate" refers to the frequency with which the heart beats and is determined as the number of heart contractions that occur in one minute (beats per minute or BMP). A healthy adult's heart rate ranges from 60 to 100 beats per minute, regardless of age or gender. In some circumstances, such as while under stress, the heart rate may rise. With the exception of a few

rare examples of anomalies, pulse rate is the most basic way of monitoring heart rate and is extremely accurate.

Following positive carotid artery measurement results, a sensory device is implanted in the earlobe to assess the condition (A style Z Health Guide from WebMD, accessed September 21, 2006). The connection between heart rate and body temperature is highly important. In the absence of any other factors, the heart rate and body temperature are directly linked. A change in heart rate of 10 beats per minute (BMP) equates to a 1-degree Celsius change in body temperature. Heart rate variability is frequently recognized as a useful indicator of stress and worry (Shoemaker, 1996).

Standley (1991) examined variations in heart rate and finger temperature during her study to determine the influence of music on stress management. A Somatron™, which was designed to produce different combinations of sounds depending on music and the son of a dental workout, was used to create vibrotactile stimulation. The Somatron™ is a machine that, when combined with a sound source, produces physical vibrations or vibrations that the body perceives as vibrations. The vibration relaxes the muscles and increases circulation in the back, spine, and legs, resulting in profound relaxation and relief from back, spinal, and leg discomfort.

Any music or song's rhythm may be utilised to activate the Somatron™, which can then be used to create stimulation (Brajkovic, 2001). Standley (1991) investigated 130 music students divided into five groups of 26 students each, each comprising 13 male and 13 female students. The groups were subjected to various vibrotactile stimuli, which were activated by music or the sound of exercise, as well as suction during a dental procedure, among other things. During the trial, they were only alternated with music or ambient noise in a variety of combinations. When compared to dental drill noises, the researchers observed that the vibration produced by music caused finger temperatures to rise and pulse beat rates to decrease in participants' hands. The music was not detailed, and the presence of the dental drill as a contrast may have caused the participants to become more conscious of the stress they were feeling. Despite this, the measurement methods were also successful.

3. Blood pressure (sometimes referred to as arterial pressure):

The pressure produced by blood on the walls of blood vessels is referred to as blood pressure.

Unless otherwise specified, blood pressure refers to the pressure in the major arteries that transport blood to locations other than the lungs, such as the brachial artery, and does not include heart rate. Most blood pressure readings are given in millimeters of mercury (mm Hg). Systolic pressure is the greatest pressure in the arteries during the heart cycle, whereas diastolic pressure is the lowest pressure in the arteries during the cardiac cycle's resting period (Marchello, 2006). A resting and healthy adult's blood pressure should be about 120 mm Hg systolic and 80 mm Hg diastolic (written as 120/80 mm Hg), with some variation depending on the individual.

Blood pressure does not remain constant throughout the day (due to a circadian rhythm) and changes in reaction to stress, diet, medicines, and illnesses (Warren, 2000). In the short term, stress can cause a rise in blood pressure; however, the long-term repercussions of stress are not yet known. Measures for stress management, on the other hand, do not appear to be beneficial in avoiding high blood pressure. Given that high blood pressure has been related to cardiovascular illness, Chafin et al. (2004) conducted an experiment to illustrate how music can help with blood pressure recovery after stress, despite the fact that not all music was beneficial. The variation in

blood pressure was compared with a change in heart rate for the aim of stress evaluation to determine the usefulness of blood pressure as a criteria for stress.

4. Muscle contraction.

Muscular tone or muscle tension refers to a constant and passive partial muscle contraction in the muscles that helps to maintain posture and is present even while resting. Unconscious nerve impulses keep the muscles partly clenched. When you pull or stretch quickly, your body responds by raising muscle tension on its own. This is known as autonomic response. Reflexion helps to maintain equilibrium while also protecting against harm. Recent ideas have been proposed to explain the emergence of musculoskeletal disease symptoms in persons who work in professions that are just moderately physically demanding (Hagg, 1991; Knardahl, 2002).

According to Hagg's theory, the "Cinderella hypothesis" refers to the fairy tale heroine Cinderella, who was the first to wake up and the last to retire to bed. It was discovered that the motor units of a given muscle are recruited in a certain order. Small, low-threshold motor units are recruited first, and they remain active until the muscle is fully relaxed.

When these devices are left on for a lengthy amount of time, they can cause degenerative processes, harm, and discomfort in the body.

Recent study has shown that muscular tension is caused not just by physical demands, but also by emotional pressures.

1. The reaction of Galvanic Skin is as follows:

The galvanic skin response (GSR) technique can be used to assess the electrical resistance of the skin.

The assessment of the autonomous nervous system response, which is commonly recognised as a metric, is considered to be used to assess sweat gland function. There is a relationship between sympathetic activity and emotional excitement, although the exact nature of the association is unknown. Some people's GSRs are quite sensitive to their emotions, whilst others' GSRs are not.

Fear, rage, and other emotions may all generate GSR responses on a par with one another (Shoemaker, 1996). To assess GSR, two pathways to the skin are linked together, giving in a simple assessment. The GSR may then be estimated by measuring the resistance as the current passes through the body during the research, assuming one is performed.

The technique of passive GSR is used to measure the current generated by the body itself. GSR has been supplanted by more contemporary technologies, although GSR has survived because to the low-cost hardware (galvanometer) utilised in the process (Shoemaker, 1996).

Peretti and colleagues (1974) conducted a study with 100 pupils. The majority of the topics were about music. The individuals were told to go through a labyrinth while blindfolded. With each failed effort, the topic was judged incorrect, and the process had to be repeated until the GSR indicated an increased level of anxiety. The whole experiment was conducted in a variety of settings, with or without music playing before to, during, and/or after the test, depending on the conditions.

Music was proven to not only assist reduce stress, but it also had a distinct impact on the degree of anxiety experienced by men and women, as well as those who majored in music versus those who did not. The patient's anxiety was much reduced as a result of her presentation of the

musical selection. Music majors, both male and female, had lower stress levels than non-music majors. It's conceivable that this has anything to do with their musical sensibility. Men, on average, exhibited a larger reduction in stress than women. Zimny and colleagues (1962) studied the effects of music on children's GSR and observed that music induces differential GSR in children in the same manner as it does in schizophrenic students aged 20 or 50.

2. Immunological and neuroendocrine stimulation responses:

The numerous components of the human immune system, which are made up of a complex cell, organ, and tissue constellation, are linked by a sophisticated and dynamic network of connections. It is intended to maximize harmful organisms' reaction to an invasion of their area. In actuality, the immune system is a succession of detection and adaptation processes that culminate in a very effective infection-fighting mechanism.

Stress or anxiety is a condition that is extremely detrimental to the body's health. A wide range of physiological reactions support this. A frequent trend among people is that they fight external difficulties, such as illnesses, and that their bodies remember those external components.... When the human body is stressed, the physiological processes that occur are similar to those that occur when the body is fighting a sickness.

There are several situations in which the conditioned reaction to memory and association music, as it relates to the lives of musicians, resulting in a particular quality of life.

Many people who are worried or suffering from illnesses may have a profoundly pleasant emotional experience while listening to music that is significant to them. This might promote the production of hormones, which can help to decrease the disease-promoting components.

Barlet and colleagues (1993) conducted a series of studies based on the premise that if stress was treated and battled as an illness by the human body, the immune system would react similarly, which they discovered to be accurate.

Typical questionnaire analysis sets were used to conduct self-reports and psychological assessments on participants.

Many physiological reactions to music's usefulness as a stress reliever have been tested, but the experience of stress is also subjective. Music's efficacy as a stress-relieving aid has also been investigated by researchers. In psychological research investigations, questionnaires, especially self-reporting rating scales, are frequently utilised. Smith (2001) directed the R-State scale's creation and specialised in the examination of participants' psychological states. However, there are several conflicting findings that are freely accessible.

One probable reason for this discrepancy is the individual's previous musical knowledge.

Stratton (1992) performed study on 42 men and 48 women who had completed an introductory psychology course at the university to accomplish this. In a series of experimental scenarios, participants were asked to wait for an appointment outside an office for a total of 10 minutes. Depending on the scenario, people were obliged to wait alone or in groups, with or without music and social interaction. Participants were asked to fill out a questionnaire to assess their degree of stress. One of the most important questions was how long they anticipated to be able to hold out (their wrist watches had been removed). The band that stayed silent in front of strangers and didn't play any music had the longest recording, clocking in at 16.33 minutes.

Because psychologically mediated variables have been shown to impact the results of therapeutic therapies such as chemotherapy and bone marrow transplantation, music therapy may be useful to patients. In such conditions, the frequency of negative psychological illnesses such as concern and sadness, as well as emotional weariness and despair, is widespread, and the quality of life of survivors is generally reduced as a result.

Sahler et al. (2003) performed a research to assess the benefits of music therapy in bone marrow transplant patients (BMT). They are compelled to make physiological and psychological adaptations as a result of their pain. An intervention was necessary to have an influence not only on their general well-being, but also on the control of physiological symptoms, notably measurable immunological markers. Music therapy was chosen for this study due to its demonstrated efficacy in promoting emotional self-regulation under medical conditions, such as decreased pain sensation, anxiety reduction, stress-related reductions in cardiovascular and endocrinological reactions, relaxation increases, and immunological defence. The objective of this study was to reduce the feelings of agony and sadness, as well as the nausea and vomiting symptoms that came with it. The trial's findings were important. After taking the drug, subjects reported a significant reduction in their nausea, vomiting, and pain sensations.

Discussion of Findings:

Much progress has been made in the study of physiological reactions to musical stimuli since the end of the nineteenth century, and the idea that music has an influence on physiological processes has received universal recognition.

The same or similar music, when heard by various persons, can produce positive, negative, and occasionally unchanged physiological reactions (Dainow, 1977). A stimulus for cardiac response to music, according to Hodges (1980), has generated a range of conflicting results. The heart rate increased in response to stimulating music and reduced in response to calming music, according to seven of the twenty-one studies evaluated. According to five studies, every form of music, whether thrilling or soothing, has the ability to raise heart rate. Two studies have discovered that both stimulative and sedative music may have an effect on heart rates, albeit the results were unexpected in both cases.

CONCLUSION:

Finally, seven research have shown that music has no influence on heart rates and is hence useless in stress management. Similarly, research into the numerous physiological characteristics of music as a stimulus has yielded radically disparate results (Hodges, 1980). Given the stunning magnitude of the inconsistencies discovered here, it is apparent that more research is required. These abnormalities might be caused by a lack of statistical analysis, control, standardised measuring procedures, defective equipment, or a lack of baseline data. The description of music as sedative or energising only on the basis of the number of beats per unit time might be another explanation that ignores the subject's attitude and choice in the music they listen to. On the other hand, it is conceivable to suppose that all people have a comparable reaction to musical or other stimuli, which entirely rules out the idea of idiosyncratic physiological reactions.

Music has already been proven to be an effective stress-reduction method in research. Certain researchers have discovered several connections between stimuli and response. However, the findings were more inaccurate, most likely because the individual distinctive reactions to stimuli were not taken into account. Jellison (1975) discovered a reduction in subjective anxiety in his participants without a significant change in blood pressure, finger temperature, or pulse rate.

O'Connell (1984) reported similar findings, indicating that college students who listened to music before examinations reported lower anxiety levels but no changes in finger temps or pulse rates. Scartelli (1984) made the discovery.

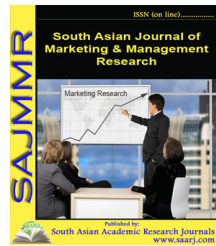
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DOI: [10.5958/2249-877X.2021.00052.7](https://doi.org/10.5958/2249-877X.2021.00052.7)

THE USE OF MULTIMEDIA EDUCATIONAL PROGRAM "PHYSICAL EDUCATION AND SPORT" IN PEDAGOGICAL UNIVERSITIES

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ABSTRACT

This article is written about the program "Physical Education and Sports", which is taught in pedagogical universities. Also, the article analyzes the application of multimedia products, educational programs in physical education. The article uses research methods such as work with scientific documents, pedagogical analysis, mathematical-static analysis, interview. In conclusion, suggestions and recommendations are given.

KEYWORDS: *Physical Education, Multimedia Educational Program, Sports, Pedagogical Universities.*

INTRODUCTION

In current conditions of mass network communication and globalization, the development of digital technologies used in all spheres of human activity, including in the field of education which is becoming an important direction in state policy.

The need for digital transformation of these areas was also reflected in the Presidential Decree "On Approval of the Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030" –Presidential decree №5847 from 08.10.2019[1].

As stated in the Concept “raising the content of higher education to a qualitatively new level, establishing a system for training highly qualified personnel who can find their place in the labor market, make a worthy contribution to the stable development of the social sphere and sectors of the economy; introduction five initiatives into practice, including a set of measures aimed at creating additional conditions for training and educating student youth”[1].

The process of using digital technologies at the current level of development of society supposes, first of all, a digital transformation of the main functions in activities, meaning transition to new digital operational and educational models in teaching and educational activities and management of pedagogical universities.

Issues related to the analysis and generalization of the experience of digital transformation of physical education and the sphere of physical culture and sports and, first of all, issues related to the creation and use of state of the art digital educational resources in both the educational process and in the field of physical culture and sports acquire special relevance.

Materials and Methods

Physical culture is an irreplaceable environment for the formation of physical, moral, intellectual and spiritual development of the person as well as an important means of promoting health.

The main task of physical culture in universities is to preserve and strengthen the health of students, and to form their habit of regularly engaging in physical culture and monitoring their own health. [10]

Consequently, traditional methods of constructing physical education classes are losing their relevance therefore, teachers began to devote more time and effort to developing new versions of building the educational process using digital and media technologies.

Analysis and Discussion

Physical culture and sports are generally recognized material and spiritual values for each person individually and for society on the whole. The use of digital technologies has become an important tool for organizing the educational process, since it is becoming more and more difficult to interest students in physical culture lessons, attending classes is not regular, which means that new forms, techniques, methods and technologies for conducting classes are needed. A new technology in this area is digital educational technologies.

In our country, the education system is actively being replaced to a digital format. The introduction of digital technologies into the educational space undoubtedly entails the inclusion of new tools for educational activities.

“Digital transformation in education should be understood as a complete restructuring of the educational process, which includes not only teaching methods and means, but also changes in the competency model, in the semantic model of the educational program, changes in approaches to assessing teacher's work, as well as digital management of pedagogical processes in educational institution. In these conditions, considerable attention is paid to updating the model of the educational process based on the use of modern digital information technologies, covering almost all aspects of this process such as goals, content, means and methods of teaching, organizational forms of their implementation”[5,67-p.].

The main tasks of higher education in the training of physical education teachers, in the context of the digital transformation of education, is the availability of skills to prepare for the rapid changes taking place in the information society. In relation with the spread of coronavirus infection (COVID-2019) for educational institutions in general and pedagogical universities, at the faculties of physical education in particular, was the fact that their transfer to distance learning began. The use of modern digital information technologies in the educational process made it possible to take a different look at the educational process in universities, as university tutors faced difficulties associated with both the creation and use of digital information educational resources in the educational process.

In a pandemic in order to organize the educational process, the capabilities of social networks such as: Telegram, Facebook, Twitter, Instagram, Vkontakte, etc. are actively used. Applications

such as Adobe Connect, Zoom and Jitsi Meet have been praised and broadly used for organization of video conferencing and webinars in educational institutions.

“The digital transformation of the education system provides for the development of information infrastructure and the improvement of the education system, training of relevant personnel who own modern information and digital technologies in solving professional problems, acting as new sources and new ways of obtaining information, pedagogical tools that allow to achieve certain results in the training process of future specialists in physical culture and sports ”[4,76-p.].

In our opinion, in a broader sense, the digital transformation of physical education should cover all aspects of the educational process at the university, related to its organization and management based on digital information technologies, including the process of training and certification of students, the schedule, the formation of their portfolio, accounting of workers. programs in disciplines, pedagogical workload management, personnel records, financial management, providing access to electronic library systems.

Digital information technologies are gaining significant importance in the training of physical education teachers, organization and conducting sports competitions, health-improving gymnastics.

As part of the study, we have developed and passed approbation in the universities of our republic - in the Navoi State Pedagogical Institute, Bukhara State University in 2018-2020 multimedia educational programs "Physical culture and sport", "Sport in my life" which were oriented for future teachers of physical culture. There were overall 67 teachers and 631 students who took part in the approbation of multimedia training programs.

The main functions of multimedia education were: self-control; correction; exercising; external control.

As its known, in the system of training future specialists, it is envisaged to consider professional standards. Therefore, for example, the standard in the direction of training teachers in physical culture provides for: the development of physical, strong-willed, organizational qualities.

The multimedia educational program "Physical culture and sport" reflected the sections that were intended for the preparation of physical culture lessons and sports competitions. This required serious preparation, especially in those kinds of sports in which the assessment of competition results is carried out on the basis of high-quality physical data (kurash, artistic gymnastics, sport aerobics, etc.).

In the multimedia training program "Physical culture and sport" for physical education teachers, we took into account: the specificity of training: (teaching technique, tactics using various videos), on the other hand, the use of distance learning alone is clearly not sufficient here, since the development of specific motor actions, training in the ability to demonstrate, training in the methodology of conducting classes and other things is possible only in practical classes under the guidance of a teacher. Also, this educational multimedia program was aimed at training future physical culture teachers who should be able to diagnose the functional systems of the body, have psycho diagnostic skills in sports and master the monitoring of the physical condition and health of those involved in physical culture and sports.

This program has several sections. The very rules of competitions with various comments, built on the basis of hyperlinks are primarily associated with their assimilation, especially with regard

to the assimilation of exercises attributed to different groups of complexity, execution technique, for which each exercise is accompanied by a video, graphic and terminological description.

Section "Physical activity" allows you to analyze the various combinations performed by different athletes in various sports and compare their assessments with the data of experts. The "Knowledge Test" section allows you to assess the knowledge of the rules of the competition and the ability to carry out practical refereeing in the so-called virtual competitions. Thus, the main function of such a program is: training, correction, training, self-control, external control.

When using the multimedia training program "Physical Culture and Sports", we offered works on various platforms (Coursera, Udaciti, edX, Universarium, Stepik, etc.). However, it should be noted that on these platforms there are special courses related to the physical culture and sports, practically none. Most universities in our republic develop and use such programs in the Moodle distance learning system.

In the developed programs, we also took into account the specifics of sports and pedagogical disciplines (the use of video fragments related to the technique of performing various exercises, tactical actions, with the methodology of conducting classes and etc.). Video fragments are used both to accompany educational material and to test knowledge on specific topics and the discipline on the whole.

The multimedia educational program "Physical culture and sports" developed by us has a certain value first of all, for students who are active athletes, constantly go to training camps and competitions and cannot attend classes with a group. Certainly, it should be noted here that distance learning courses are carried out in a mixed way, when they are developed and implemented in the main theoretical sections of sports and pedagogical disciplines, since training in specific motor actions takes place in practical classes with the participation of a teacher, trainer in connection with the need to provide insurance and assistance, safety precautions.

CONCLUSION

When preparing future physical education teachers in on-line training, it is important to consider the following aspects:

1. Role in the organization of the educational process of digital multimedia presentations. First, they are used in the provision of educational material at lectures, when the presentation includes various video fragments related to the technique of teaching motor actions, tactical actions, teaching methods, methods of conducting a lesson, etc. Secondly, today not a single pre-defense and defense of graduation qualification works are complete without their use. Third, students prepare and defend their projects through presentations. Fourthly, with the help of the PowerPoint program, you can create and actively use various tests to assess knowledge in various sports and pedagogical disciplines. An essential function of the presentation which appeared during the pandemic is the creation and use of video presentations that can be used by both teachers to communicate information to students and by students in the preparation of video reports to protect their graduation qualifications works (GQW) in a remote form using video conferencing.
2. An important task of the learning process in the context of its digital transformation is the creation and use of automation tools control and measuring processes and assessing the quality of education. Based on the control data, the teacher receives information about the

results of his work (feedback) and if necessary, can make edits in it and for the student itself this is an assessment of his work.

“Tasks in control programs can have a different structure: a question in the form of a text and text options for answers, a question accompanied by a graphic illustration, for example, a movie of a sports motor action or a video clip, etc. This task is quite efficiently solved by digital multimedia control programs. The main functions of such programs: external control of the success of training in individual sections of the course; external control of the success of training in the course (discipline) as a whole; automatic registration of control results; the possibility of direct registration in the student's personal portfolio in the integrated information and analytical system (IIAS) for subsequent analysis and certification of students” [12, 15-p.].

1. Accounting for educational sites and mobile applications for physical education tutors. Primary functions are: training; self-control; external control. This allows 100% implementation of multimedia training and also creates the opportunity to expand the number of students.

For example, when using the “Sports in My Life” multimedia application, we used these functions on the example of an educational website and mobile application for training in band kurash.

Training with the help of educational sites and mobile applications for physical education teachers was carried out along different trajectories depending on what decision the user himself makes. There are several possible options for working - viewing video material and text descriptions of the certification program, viewing individual elements in the "Techniques", "Falling Techniques", "Movements" and "Lay on Shoulders" sections. After mastering these sections, students moved on to the section "Uzbek kurash" which includes knowledge control, simulator and user questionnaire.

The mobile application allows you to significantly expand the scope of the website as it makes it possible to use not only a personal computer but also smartphones and tablets.

In the organization of physical culture and sports activities (during sports training, the organization and leading sports competitions, physical culture and health-improving work) various software and hardware complexes are actively used nowadays which make it possible to quickly assess and correct the educational and training process using various diagnostics in laboratory conditions as well as mobile means which make it possible to assess the condition of athletes directly in the "field" conditions to manage the training process using various mobile applications, increase the objectivity of assessing the results of competitions.

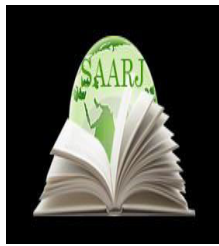
Thus, the conducted research creates the possibility of using digital information technologies in the preparation of future physical education teachers.

Digital educational resources created and used in the educational process have shown their effectiveness in the system of training specialists in physical culture.

The use of the multimedia application "Sport in My Life" allows digital control to be applied in the pedagogical process, to quickly assess and correct the educational and training processes.

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South Asian Journal of Marketing & Management Research (SAJMMR)

(Double Blind Refereed & Peer Reviewed International Journal)



DOI: **10.5958/2249-877X.2021.00053.9**

VARIOUS WAYS OF SOLVING EXTREMUM PROBLEMS

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ABSTRACT

This article deals with extremum problems solved in various ways. Demonstrated different approaches to problems. The presented different solutions are compared and it is determined that each is distinguished by the naturalness of reasoning, while the other is somewhat artificial. The solutions of extreme problems by different methods are shown and the choice of them contributes to the development of students creative thinking.

KEYWORDS: *Extremum, Segment, Vector, Parallel, Perpendicular, The Method Of Lagrange Multipliers.*

INTRODUCTION

It has already become a tradition to use it in any extreme problem. Meanwhile, for many of these problems, there are other ways of solving algebraic, geometric, which were used for centuries, until differential and integral calculus was invented.

But even after the development of methods of analysis, the techniques of algebra and geometry were not forgotten, and in many cases turned out to be preferable to new methods. It is hardly worth turning a blind eye to this fact and turning to derivatives, even in cases where it is easier to do without them.

The purpose of the article, admitting various solutions, is usually interesting and instructive. Each of them demonstrates the capabilities of any one method, and comparison of solutions allows students to develop their own system of approaches to problems, develops their intuition, and provides the necessary experience.

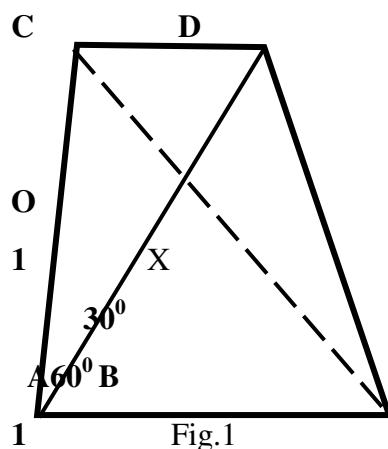
Let us present extremum problems admitting various solutions.

Example 1. Find the smallest value of an expression:

$$\sqrt{1+x^2-x} + \sqrt{1+x^2-x\sqrt{3}}$$

Solution. 1 way: geometric method.

It is clear that the smallest value of this expression will be at $x > 0$. Take a right angle with apex A and set aside the segments $AB = AC = 1$ on its sides (Fig.1.)



Having drawn a ray through point A inside the corner, forming angles of 60° and 30° with its sides, we put on this ray the segment $AD = x$. By the cosine theorem, we find that the first term is equal to BD , and the second is equal to CD , i.e. this expression is equal to $BD + CD$. It will be the smallest when D

lies on the segment BC , i.e. the smallest value is $\sqrt{2}$. For what values of x does this expression have the smallest value $\sqrt{2}$. The area of a right-angled triangle ABC is equal to the sum of the areas of triangles AOB and AOC :

$$\frac{1}{2} = \frac{1}{2} \cdot 1 \cdot x \sin 60^\circ + \frac{1}{2} \cdot 1 \cdot x \sin 30^\circ$$

$$1 = x \cdot \frac{\sqrt{3}}{2} + \frac{x}{2}, x = \frac{2}{\sqrt{3} + 1} = \sqrt{3} - 1.$$

2 way: coordinate method.

$$\sqrt{1+x^2-x} + \sqrt{1+x^2-x\sqrt{3}} = \sqrt{\left(x - \frac{1}{2}\right)^2 + \frac{3}{4}} + \sqrt{\left(x - \frac{\sqrt{3}}{2}\right)^2 + \frac{1}{4}}$$

$$A = \left(\frac{1}{2}; \frac{\sqrt{3}}{2}\right), B = \left(\frac{\sqrt{3}}{2}; \frac{1}{2}\right), B' = \left(\frac{\sqrt{3}}{2}; -\frac{1}{2}\right), C = (x; 0)$$

Comparing the above three solutions, we notice that the first is distinguished by the naturalness of reasoning, while the second is somewhat artificial, and the third is a classical method.

Example 2. The real numbers x_1, x_2, \dots, x_n belong to the segment $[-1;1]$, and the sum of the cubes of these numbers is 0. Find the largest value of the sum:

$$x_1 + x_2 + \dots + x_n$$

1 way: algebraic method. Consider a polynomial satisfying the conditions of the problem

$$P(x) = 4(x+1)\left(x - \frac{1}{2}\right)^2 = (x+1)(4x^2 - 4x + 1) = 4x^3 - 3x + 1 \geq 0$$

$$P(x_1) = 4x_1^3 - 3x_1 + 1 \geq 0$$

$$P(x_2) = 4x_2^3 - 3x_2 + 1 \geq 0$$

.....

$$P(x_n) = 4x_n^3 - 3x_n + 1 \geq 0$$

Adding the n obvious inequalities $P(x_i) \geq 0$, where $i = 1, 2, \dots, n$, we obtain

$$4(x_1^3 + \dots + x_n^3) - 3(x_1 + x_2 + \dots + x_n) + n \geq 0$$

by the condition of the problem

$$x_1^3 + x_2^3 + \dots + x_n^3 = 0$$

then we get the following inequality

$$3(x_1 + x_2 + \dots + x_n) + n \geq 0$$

where

$$x_1 + x_2 + \dots + x_n \leq \frac{n}{3}$$

2 way: trigonometric method.

We put that $x_i = \cos \varphi_i, i = 1, 2, \dots, n$.

We know that $\cos 3\varphi = 4\cos^3 \varphi - 3\cos \varphi$ from this formula we get that

$$4\cos^3 \varphi_i - 3\cos \varphi_i, i = 1, 2, \dots, n.$$

$$4\cos^3 \varphi_1 - 3\cos \varphi_1 \geq -1$$

$$4\cos^3 \varphi_2 - 3\cos \varphi_2 \geq -1$$

.....

$$4\cos^3 \varphi_n - 3\cos \varphi_n \geq -1$$

Where

$$4(\cos^3 \varphi_1 + \dots + \cos^3 \varphi_n) - 3(\cos \varphi_1 + \dots + \cos \varphi_n) \geq -n$$

$$4(x_1^3 + \dots + x_n^3) - 3(x_1 + \dots + x_n) \geq -n$$

$-3(x_1 + \dots + x_n) \geq -n$, or

$$x_1 + \dots + x_n \leq \frac{n}{3}$$

Comparing the two solutions presented, we notice that the second is distinguished by the naturalness of reasoning, while the first is somewhat artificial. However, the first solution is clearer.

Example 3. Find the extrema of the function $f(x, y) = 3x + 4y$ in condition

$$x^2 + y^2 = 16.$$

1 way: algebraic method. Let us calculate the sum of the following two terms

$$\begin{aligned} (3x + 4y)^2 + (3x - 4y)^2 &= 9x^2 + 24xy + 16y^2 + 9x^2 - 24xy + 16x^2 = 25x^2 + 25y^2 \\ &= 25(x^2 + y^2) = 25 \cdot 16 = 400 \end{aligned}$$

$$(3x + 4y)^2 = 400 - (3y - 4x)^2, |3x + 4y| \leq 20$$

from here

$$-20 \leq 3x + 4y \leq 20, \begin{cases} y = \frac{4}{3}x & x = \pm 2,4 \\ x^2 + y^2 = 16 & y = \pm 3,2 \end{cases}$$

means

$$f_{max} = f(2,4; 3,2) = 20$$

$$f_{min} = f(-2,4; -3,2) = -20$$

2 way: geometric method. The level lines of the function $f(x, y) = 3x + 4y$ are parallel straight lines with the slope $k = \frac{3}{4}$. Obviously, the minimum is attained at point B, and the maximum at point A of the tangency of the level line and the circle $x^2 + y^2 = 16$. Let us find the coordinates of the point A and B.

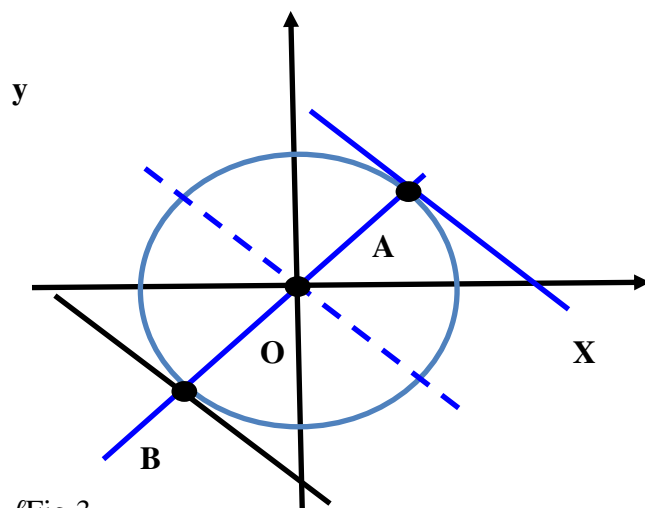


Fig.3

To do this, it is enough to make the equation of the straight line "l" and solve the system, consisting of the equation of the straight line and the equation of the circle. Note that line "l" is perpendicular to the level line, and therefore, its slope K_1 is $\frac{4}{3}$ ($K_1 K = -1$).

Line ℓ passes through point O and has a coefficient $K_1 = \frac{4}{3}$. Therefore, its equation is as follows:
 $y = \frac{4}{3}x$. Solving the system

$$\begin{cases} x^2 + y^2 = 16 \\ y = \frac{4}{3}x, \end{cases}$$

we get

$$x = \pm 2, 4, y = \pm 3, 2.$$

So, a minimum of -20 is reached at point $B = (-2, 4; -3, 2)$, and a maximum of 20 is reached at point $A = (2, 4; 3, 2)$.

3 way: trigonometric method. We know that the equation of the circle in parametric form has $x = R \cos t, y = R \sin t$, where R is the radius of the circle. Then our function has the form

$$3x + 4y = 3 \cdot 4 \cos t + 4 \cdot 4 \sin t = 12 \cos t + 16 \sin t = \sqrt{12^2 + 16^2} \sin(t + \varphi)$$

where

$$\varphi = \arctg \frac{12}{16} = \arctg \frac{3}{4}$$

Means, $3x + 4y = 20 \sin(t + \varphi)$, $-1 \leq \sin(t + \varphi) \leq 1$, $-20 \leq 3x + 4y \leq 20$.

Problem solved.

4 way: The method of Lagrange Multipliers.

Suppose $f(x, y)$ and $g(x, y)$ are functions whose first-order partial derivatives exist. To find the relative maximum and relative minimum of $f(x, y)$ subject to the constraint that $g(x, y) = k$ for some constant k , introduce a new variable λ (the Greek letter lambda) and solve the following three equations simultaneously:

$$f'_x(x, y) = \lambda g'_x(x, y), f'_y(x, y) = \lambda g'_y(x, y), g(x, y) = k$$

The desired relative extrema will be found among the resulting points (x, y) .

Now let's return to our task

$$f(x, y) = 3x + 4y, g(x, y) = x^2 + y^2, x^2 + y^2 = 16.$$

Use the partial derivatives

$$f'_x = 3, f'_y = 4, g'_x = 2x, g'_y = 2y$$

to write the three Lagrange equations you get

$$\lambda = \frac{3}{2x} \text{ and } \lambda = \frac{4}{2y}$$

(since $y \neq 0$ and $x \neq 0$), which implies that

$$\frac{3}{x} = \frac{4}{y} \text{ or } y = \frac{4}{3}x$$

$$\begin{cases} x^2 + y^2 = 16 \\ y = \frac{4}{3}x, \end{cases}$$

from here

$$x = \pm 2, 4, y = \pm 3, 2.$$

$$f_{min} = f(-2, 4; -3, 2) = -20, f_{max} = f(2, 4; 3, 2) = 20.$$

In the third example, the first, second and third methods are particular methods of solving problems. The fourth way is a general technique for solving problems, based on methods of mathematical analysis.

Example 4. If the product of two positive numbers is not less than their sum, then find the smallest value of their sum.

Solution.1 way: Inequality method. This problem has many different solutions using simple inequalities for two positive numbers:

$$\frac{x+y}{2} \geq \sqrt{xy}, \frac{x}{y} + \frac{y}{x} \geq 2 \text{ and etc.}$$

We write the condition $ab \geq a + b$ as follows:

$$(a - 1)(b - 1) \geq 1$$

Both parentheses must be positive (after all, $0 < a < 1$, then $(a - 1)(b - 1) < 1$). Then, according to the inequality between the arithmetic and geometric means $a - 1$ and $b - 1$, we have

$$a - 1 + b - 1 \geq 2\sqrt{(a - 1)(b - 1)} \geq 2.$$

From here $a + b \geq 4$. Hence, the smallest value of numbers is 4.

2 way: Inequality method. This condition is equivalent to the fact that the harmonic mean of the numbers a and b is not less than 2:

$$\left(\frac{a^{-1} + b^{-1}}{2}\right)^{-1} \geq \frac{2ab}{a + b} \geq 2$$

But the arithmetic mean is less than the harmonic mean:

$$\frac{a+b}{2} \geq \frac{2ab}{a+b} \geq 2.$$

From here

$$a + b \geq 4.$$

3 way: Inequality method. Dividing this condition by a and b , we get

$$a \geq \frac{a}{b} + 1, b \geq \frac{b}{a} + 1$$

whence

$$a + b \geq \frac{a}{b} + \frac{b}{a} + 2 \geq 4$$

4 way: Inequality method.

Put $S = a + b$

$$\frac{(a+b)^2}{4} \geq ab \geq a+b, \text{ for } S = a+b$$

we get

$$\frac{S^2}{4} \geq S \text{ or } S \geq 4 \Rightarrow a+b \geq 4$$

We suggest the reader to choose the cutest one to his taste.

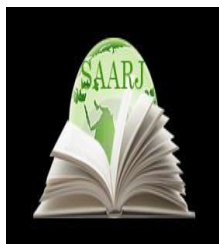
CONCLUSION

One of the ways to establish connections between algebra and geometry is to use the geometric method in solving algebraic problems, which involves the construction of a geometric model of the problem and its analytical solution, which is based on exact geometric relations.

Solving extreme problems in different ways and choosing the most rational of them contributes to the development of creative thinking of students. The conducted pedagogical experiment confirmed the effectiveness of the developed methodology for teaching mathematics based on solving extreme problems by different methods leads to the intensification of the cognitive activity of students, the development of their creative abilities, and the improvement of integral ideas about mathematics and hermethods.

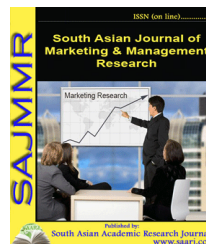
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South Asian Journal of Marketing & Management Research (SAJMMR)

(Double Blind Refereed & Peer Reviewed International Journal)



DOI: **10.5958/2249-877X.2021.00054.0**

USE OF MODERN INFORMATION TECHNOLOGIES TO INCREASE THE EFFECTIVENESS OF LANGUAGE LEARNING

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ABSTRACT

A hard disk drive (HDD) is an external memory that is the primary storage device in a computer. It stores all programs and data. Hard disk drives are often referred to as hard disks because they consist of aluminum and ceramic disks coated with a rotating ferromagnetic layer. Once the appropriate settings have been made and the interactive whiteboard is in working condition, it is possible to interact with the images projected on the surface of the interactive whiteboard using a projector. Portable overhead projectors have a prefabricated structure that does not exceed 7 kg. Typically, such models are very convenient with easy assembly and have a special set of bags for carrying. During videoconferencing, a microphone is mounted directly on the head of the camera, in such sizes the color balancing is done automatically, increasing the sharpness of the image is done manually. Beginner cameras have 5 video signals and a composite output.

KEYWORDS: *Hardware, interactive hardware, operating systems, modern operating systems, Distributors, Mobile operating systems, interactive training, multimedia presentations, Internet resources, software.*

INTRODUCTION

Today, the application of new information technologies in the learning process you cannot imagine. These include: programmed learning (teaching the process of learning through automated program management), interactive learning, multimedia presentations, Internet resources, software, etc. . The process of effective implementation of the above is directly related to the technical means used. Let's get acquainted with them.

Computers are divided into large computers and small computers. The class of large computers includes servers and supercomputers. The small computer class includes personal computers (PCs), laptops.

A server computer is a dedicated computer that stores the main database in a computer network.

Supercomputers are computers that require a lot of speed and are designed to solve large-scale problems. They run several hundred times faster than ordinary PCs and perform special operations.

Personal computers (PCs) are universal and single-use computers that meet different requirements for use. Personal computers include computers at home and at work that we use in our daily work, such as Pentium computers.

Laptops are portable personal computers designed to be carried on the road. Laptops can include computers such as Lap Top, Note Book, Palm Top, Electronic Secretaries (PDA), organizer.

Lap Top laptops are made in the form of small suitcases the size of a diplomat. The hardware and software allow them to compete successfully with the best real estate PCs.

Computer notebooks (Note Book and Sub Note Book, also called Omni Book - "everywhere now") perform all the functions of desktop computers. They are made in the form of a small book-sized suitcase. In many respects, it is compatible with Lap Top, but differs only in size and a number of small amounts of RAM and disk memory.

Many computer notebook models provide communication with modems to connect to a communication channel and, accordingly, to a computer network. They have small liquid crystal monochrome and color displays. The keyboard is always short, with Tpack Point and Tpack Pad type manipulators.

Pocket PCs (Palm Top, which means "in the palm of your hand") weigh 300 grams. They are full-fledged personal computers with a microprocessor, RAM and RAM, usually a monochrome LCD display, a compact keyboard, and port compartments for connecting information to a portable computer.

Electronic secretaries (PDA-Personal Digital Assistant, sometimes called Hand Help) have the shape of a pocket computer (weighing no more than 0.5 kg), but have a wider range of functions than the Palm Top (specifically: electronic that stores names, addresses, and telephone numbers

hardware and special software for organizing information about directories, agendas and meetings, to-do lists, expense records, etc.), special text, and sometimes graphic editing, spreadsheets.

Electronic notebooks (organizers - organizers) belong to the "lightest class" of computing computers (this class also includes calculators, electronic translators, etc.); they weigh no more than 200 grams. Organizers are not user-programmed, but have a large amount of memory. It can be used to write the necessary information and use it to edit special text, texts of work letters, agreements, contracts, agendas and business meetings.

A computer consists of two components. They are basic and advanced devices.

The basic devices of a personal computer are as follows.

1. System unit (Processor).

2. Screen (Monitor).
3. Keyboard.
4. Mouse.

The System Unit (Processor) is the main part of a computer and contains the following elements. Motherboard, microprocessor, hard drive, RAM, CD-ROM, DVD-ROM, DVD-RW, external controllers, tires, power supply, and more.



Motherboard is a basic electronic circuit, to which external device controllers are connected via a bus, which includes a microprocessor, BIOS, RAM, a set of chips on the system board, secondary memory (cache L2), bus connectors, system clock and elements such as the power supply (battery) for the CMOS, the input-output chip, and external device controllers are installed.

A microprocessor (CPU) is an arithmetic-logic device that is the "heart" of a computer.

A device called a microprocessor is a device that modifies data, controls all computational processes, and interacts with computing devices. The microprocessor is responsible for performing arithmetic and logic operations, accessing memory, controlling the execution of instructions in a program, and so on.

Computers use microprocessors from INTEL, AMD, IBM and other companies.

A hard disk drive (HDD) is an external memory that is the primary storage device in a computer. It stores all programs and data. Hard disk drives are often referred to as hard disks because they consist of aluminum and ceramic disks coated with a rotating ferromagnetic layer. Hard disk sizes may vary. There are many types of hard drives available today, ranging in size from 80-1000 Gb to 1 Tb.

Random access memory (DDR) is the working area of the processor. It stores all programs and data during business hours. Random access memory is often referred to as temporary memory, because programs and data are stored only when the computer is turned on or until the computer is restarted. All data must be saved before the computer can be turned off or restarted. There are 256, 512 Mb, 1 Gb, 2 Gb types of RAM.

CD-ROM (Compact Disk) and DVD-ROM (Digital Versatile Disk). A device that reads and writes data to disks. Initially, such media were read-only and could not be modified or overwritten. Discs and disk drives are now available in writeable and rewriteable models.

Computer peripherals include:

A scanner is a device that enters data from a paper document directly into a computer. You can enter text, diagrams, pictures, graphs, photographs, and other graphic information.

Like a copier, a scanner creates an electronic copy of an image of a paper document, not on paper - an electronic copy of the image is created.

Scanners are an important part of the electronic document processing system and a necessary element of any "electronic desk".

Scanners are divided into the following types depending on the principle of operation:

- Hand-held scanners
- Tablet scanners
- Roller scanners.

Handheld scanners are very simple to design: they are moved manually across the image. They allow you to enter a small number of image lines in a single pass (their coverage usually does not exceed 105 mm). The scanners on the handle have a recording light that notifies the operator that the scanning speed has been increased.

Tablet scanners are the most common; in which the scanning head moves automatically relative to the original; they allow you to scan both leaflets and brochures. Scanning speed: 2-10 seconds per page (A4 size).

Roller scanners are the most automated; in which the original moves automatically relative to the scanned head, often the documents are transmitted automatically, but the scanned documents are only pages.

Modem (Modulator-Demodulator) - allows you to exchange information with other computers over the telephone network.

A modem is a device that converts received (modulator) and reverse (demodulator) signals received for use on a specific communication channel.

A modem converts a digital signal into an analog signal when transmitting information and an analog signal into a digital signal when receiving information.

In addition to providing data transmission, many modems perform a number of other useful functions in telecommunications systems, including:

- sound numbering and digital sound recovery operations;
- receiving and transmitting facsimile information;
- Automatic identification of outgoing subscriber number (NAA);
- Responsibilities of answering machine and electronic secretary, etc.

Multimedia is a computer that allows you to play music and audio.

Multimedia tools are computer technologies that have different physical forms (text, graphics, images, sound, animation (images of animals), video, etc.) and are available on different media (magnetic and optical discs, audio and video tapes, etc.) is an area related to the use of information.

Multimedia tools include: audio (speech) and video input and output devices; high-quality sound (sound) and video - (video) boards, video capture boards (video grabber), which take an image from a VCR or camcorder and enter it into a computer; high-quality amplifier, speaker, large video screen acoustic and video receiver systems, headset, microphone, projector, videoglass, Webcam.

Plotters are devices that output graphic information (drawings, diagrams, pictures, diagrams, etc.) from a computer to a paper or other medium.

The principle of operation of plotters is pearl, spray, laser, thermographic, electrostatic.

A tablet is a device that enters a drawing and an image into a computer using a special pen.

Along with computers and mobile devices, modern (interactive) teaching techniques are widely used in the educational process. With the help of interactive tools, it is possible to make the most effective use of multimedia products created on the basis of graphics, sound and modern technologies in the study of a new topic, strengthening and testing students' knowledge. At the same time, the learning process becomes interesting and creative.

We will explore modern teaching techniques.

ACTIVboard (interactive whiteboard) is a modern teaching tool that works in conjunction with a computer and a projector. In addition to the interactive whiteboard, the interactive whiteboard includes a special electronic pen (stylus), software tools (interactive whiteboard driver and a special graphics editor), and a USB cable.

Once the appropriate settings have been made and the interactive whiteboard is in working condition, it is possible to interact with the images projected on the surface of the interactive whiteboard using a projector. That is, you can control the graphical interface of a computer with an electronic pen, create various objects, open previously created objects, make changes to them, and so on. All changes and new objects created can be saved to a computer memory or copied to external media for further processing. The interactive whiteboard can be controlled with a special electronic pen, as well as with the fingers, depending on what technology the interactive whiteboard was developed. In this case, a special electronic pen or fingers work like a computer mouse.

In the learning process, the interactive whiteboard can be used in two modes: in the first mode the electronic pen acts only as a computer mouse, and in the second mode it acts as all the equipment of special software (for example - a simple pen, marker, brush, eraser, scissors, magnifying glass, etc.).

Information about the position and movement of the electronic pen on the board is transmitted from the electronic board to the computer via a USB cable, and this information is processed and the actions corresponding to the movement of the electronic pen are performed.

An interactive device is an electronic device that can be mounted on a projection board (magnetic board, marker board, class board, classroom wall) or on the projector itself, making any flat, smooth work surface interactive. They do not require a separate special board.

Interactive devices include the device itself, ie a device that receives a signal from a special electronic pen, an electronic pen that sends infrared or ultrasonic signals to this receiver, an interactive device and a USB cable or wireless receiver that provides computer interaction. software tools. They work on the basis of infrared or ultrasonic technologies.

Interactive devices are fully compatible with interactive whiteboards due to their function. However, unlike them, it is a mobile device. Because of their compactness and light weight, they can be quickly moved from one room to another, which in turn allows you to use such devices effectively. After class, the interactive device can be picked up and handed over to a responsible person or taken to a designated area in the staff room.

Interactive devices can be connected to a computer directly via a USB cable or a wireless receiver. In interactive mode, the teacher has a wide range of options, just like on an interactive whiteboard. in particular:

- Ability to control the computer in front of the board: work with Microsoft Office programs, demonstrate the lesson process with pre-prepared presentations, video clips, images, drawings;
- Draw, paint, draw, write, set the finished object, zoom in, out, move the image on the screen image or on a new sheet (slide) using the equipment of the interactive device software , options for defining a specific part;
- save the work done on the board in the form of a file in computer memory or record all the processes performed on the board in the form of a video file;
- create your own interactive lesson plans, using templates and images available in the software library of the interactive device;
- Enhancing the library of images included in the software of the interactive device with new materials developed by it, and other features.

Activ Table (interactive table) - is a device with its own active surface. It is possible to download software based on user requirements. It is modern equipment for training, education and various activities. This device makes a strong impression on people because it is reflected in a strong and interesting way. This table is available in sizes from 32 to 55 inches. All types of interactive table are made of aerospace aluminum and the touch surface is covered with 6 mm thick glass. The most important component of an interactive desk is a bright touch screen. The multitach screen provides excellent visibility even in bright light. All models are equipped with a powerful charger, which allows you to hear music and voice messages loudly and clearly. Starting this desktop is very simple, you can turn it on and off using the button on the side. There are also children's types of this type of table, which can be used to install many pictures and 4 learners at a time.

An interactive projector is a projector that combines the capabilities of an interactive whiteboard. Such projectors do not require the purchase of a separate special board, the projection of the images can also be drawn on a simple classroom board, marker board or classroom wall. Unlike a normal projector, interactive projectors not only receive relevant signals from the computer and display them on the screen, but also detect and send information about the current position and movements of the electronic pen on the screen and establish two-way communication with the computer.

Overhead projector - used to illuminate images recorded on transparent films in A4 format. Depending on the weight and size, the devices are divided into portable, semi-portable and stationary models. Portable overhead projectors have a prefabricated structure that does not exceed 7 kg. Typically, such models are very convenient with easy assembly and have a special set of bags for carrying. Typically, stationary overhead projectors weigh 8 to 17 kg and are designed to be permanently installed in the auditorium. According to the general characteristics

of the projection in the models, overhead-projectors are divided into types of light-transmitting and light-reflecting.

Document cameras are small, simple devices that illuminate a visual image, quickly display an electronic image of a photo, slide, or original document.

In terms of structure: it consists of a miniature camera head with the ability to rotate in a special hinge or "flexible neck". During videoconferencing, a microphone is mounted directly on the head of the camera, in such sizes the color balancing is done automatically, increasing the sharpness of the image is done manually. Beginner cameras have 5 video signals and a composite output. Some models include an extension of the user manual: microscopes, adapter kits for 35-mm slides. Sophisticated document cameras have a special function, the color balancer is both automatic and wet.

The above tools are Operating Systems that provide unlimited possibilities for application and management. This program, which starts when the computer is turned on, manages the computer and its resources (RAM, disk space, etc.), organizes communication with the user, launches other programs (applications) to run. The OS provides a user-friendly interface with computer devices for users and applications.

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South Asian Journal of Marketing & Management Research (SAJMMR)

(Double Blind Refereed & Peer Reviewed International Journal)



DOI: 10.5958/2249-877X.2021.00055.2

STUDY OF THE MELON COLLECTION IN THE CONDITIONS OF THE CLOSED GROUND OF UZBEKISTAN

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ABSTRACT

Breeding for the creation of varieties and hybrids of melons for protected ground in Uzbekistan is a new and promising direction. Unfortunately, until recently, having a wide variety of local melons for open ground, which are the best in the world, capable of satisfying the most refined tastes, nevertheless, work on creating varieties of melons for protected ground has not been carried out. The studied collection of melons and the varieties we have selected will subsequently be used for breeding purposes.

KEYWORDS: *Varieties, Hybrids, Protected Soil, Melons, Fruit Weight, Quality, Disease Resistance.*

INTRODUCTION

Central Asia, including Uzbekistan, has long been the center of melon cultivation. Melons in Uzbekistan are among the best in the world, capable of satisfying the most sophisticated tastes of consumers [6].

Melon is not only tasty, but also healthy. Traditional medicine has long recommended the melon to emaciated patients, especially after undergoing operations. Previously, a decoction of seeds was used to treat gonorrhoea, and a decoction of the peel and roots was used to cleanse the stomach [5].

The high iron content makes melon useful for anemia, atherosclerosis and cardiovascular diseases. Like watermelon, melon is effective for kidney stones (Avicenna wrote about this).

Of paramount importance is their taste, which mainly depends on the sugar content of the pulp. The fruits contain such essential substances for the body as vitamin C, provitamin A (carotene) and pectins. Melon seeds contain up to 23–35% fat [1, 3, 12].

Currently, in the Republic of Uzbekistan, the area for melon cultivation occupies over 25,000 hectares, for watermelons, 25569 hectares, about 60 varieties have been zoned, of which more than 40 varieties of local selection [13].

However, until recently, selection work has not been carried out to create early ripening, highly productive, with high taste, resistant to powdery mildew, fusarium wilt with a fruit weight of 0.8 - 2.5 kg suitable for growing in greenhouses local varieties.

Materials and Methods

In the first scientific research institutes of vegetable and melon crops and potatoes in the greenhouse economy, since 2018, work has begun on breeding to create varieties and hybrids of melons.

In our experiments for 2020, the temperature on sunny days was 25-32°C in March, 8-15°C at night, 17-25°C on cloudy days, 30-35°C in the afternoon, 20-25°C at night, in May and June the temperature reached on some days up to 55°C without shading, after shading, the temperature in the greenhouses dropped to 35°C, at night it was at the level of 22-26°C.

According to our observations, the air humidity inside the film greenhouse was at the level of 80-90%, on rainy days it reached up to 95%. With good ventilation, this figure was at the level of 75-85%

One of the most promising cultivars is the method of heterotic breeding. So, as hybrid varieties, they have increased viability, which provides a sharp increase in yield [9].

The basic directions for obtaining hybrid seeds by natural cross-pollination of the original parental forms are: use as one of the parental forms of plants with signs of male sterility, the use of forms with signaling signs, the effect on the maternal forms of physiologically active substances in order to enhance the female sex, and the use of female (genocidal) forms [4, 7, 11, 14].

The methodology of intervarietal hybridization in melon has been studied by many researchers. It was found that the best time for crossing is morning hours (from 7 to 10 hours). It has been proven that the best set of hybrid fruits occurs when freshly harvested male flowers are pollinated with pollen. According to the generally accepted method of crossing, used for breeding purposes, the melon on the eve of the opening of female flowers is castrated, and in the morning only pollination and isolation [2, 8, 10].

Research Results

In our experiments was studied a collection of 41 varieties of melons of foreign and local selection for open ground. The zoned local melon variety, Kichkintoy (meaning Tiny) for open ground, was taken as the standard, since in the Republic of Uzbekistan not a single melon variety has yet been zoned in protected soils, the Kichkintoy (Tiny) variety is medium-early ripe, the growing season is 75-80 days.

Fruits are spherical, fruit weight 0.8-1.2 kg, surface is smooth, background color is yellow, mesh is partial, coarse-meshed, bark hardness is average. The pulp is white, tender, dense, aromatic, tastes like honey. The sugar content is 8.3-11.8%. Productivity is 20-26 t / ha.

Of the studied melon cultivars, 19 cultivars were early ripening, 73-84 days, 10 mid-ripening cultivars - 86-93 days, 12 late-ripening cultivars - 104-123 days from mass shoots.

Table 1 and Figure 1 show the economically valuable characteristics of the melon varieties that emerged in the experiments of 2020 -2021.

Table 1. Economic evaluation of the separated varieties of melon when grown in film protected soil of Scientific-Research Institute of Vegetables Crops, Melons and Potatoes Republic of Uzbekistan(2020-2021)

№	Varietysamples	Descriptionoffruits				Tastingasse sment, score
		Height, length, cm	Pulpthic knesscm	Pulpcolor	Fruitpulp	
variety	Kichkintoy (Tiny)	11x9	2,5	Lightgreen	soft	5
1	L-1	15,2x12	3,3	white	soft	4
2	L-2	23,3x13	3,5	white	soft	4
3	L-3	17x11,2	2,8	white	soft	4
4	L-6	14x12	3,9	white	soft	5
5	L-161	12x9	2,6	white	soft	5
6	Rohat	14x12	2,8	white	soft	5
7	L-15	14x12	3,0	white	soft	5
8	L-160	14x11	2,7	white	soft	5
9	F ₁ -179	13x9	2,4	white	soft	5
10	L-161a	13x10	2,6	white	soft	5
11	L-1a	7x15	3,4	Lightwhite	soft	5
12	F ₁ -Dave	13x12	3,4	white	soft	5
13	F ₁ Galimax	10x14	3,3	Lightwhite	soft	5
14	NS-168	22x12	3,4	white	soft	4
15	Company	21x12	3,0	white	soft	4
16	REM	18x14	3,5	white	soft	4
17	MEL-004	14x13	2,9	Lightwhite	soft	5

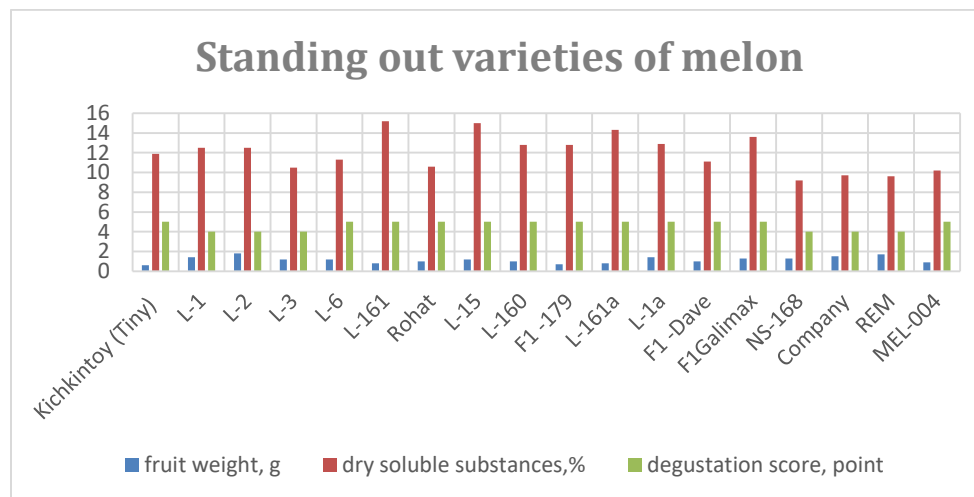


Fig. 1. Evaluation of stand-out varieties of melon

As can be seen from table 1, the separated varieties of melon had an average fruit weight of 0.6-1.8 kilograms, RSV (soluble dry matter) from 9.2-15.2%.

However, under greenhouse conditions, not all cultivars were resistant to powdery mildew (*Pseudoperonosporacubensis*), fusarium wilt (*Fusariumoxysporum* f. sp. *melonis*), and root rot (*Rhizoctoniasolani*).

Relatively resistant to root rot and fusarium wilt were F1 -179, REM, Kichkintoy, NS-168, F1-Dave. The rest of the varieties were affected by fusarium wilting from 10-20%.

So, we can make a preliminary conclusion that in the collection nursery out of 41 varieties of foreign and local selection, 18 varieties were identified as the most interesting for selection, including the Kichkintoy standard. These varieties had high taste, appearance, relative resistance to powdery mildew, fusarium wilt.

CONCLUSION

Varieties L-161, L-15, L-161a, L-160, F₁-179, L-1, L-2, L-1a, F₁-Galimax, Kichkintoy were distinguished by high taste, the melon fruit pulp was soft, sweet, aromatic. The tasting score ranged from 4-5 points. These varieties were selected and will subsequently be used for breeding purposes.

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