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Interdiciplinary

Tract Caused by Parasites

The use of the Neural Network

Highlights

Case for Empirical Treatment

Improving Professional Training

Discovering Thoughts, Inventing Future

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SARS-Cov-2 and the Case for Empirical Treatment

By Richard P. Bartlett, MD & Alexandria Watkins, DNP

Summary- As of June 17, 2020, Google Trends reports that the topics "steroids and coronavirus" have increased +4,750%.12 This is an outpatient case study that examines two patients in the United States with unique cases that involve oncology and Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), also known as COVID-19. This case study aims to reveal the identification process, diagnosis, clinical course, and management of such a distinctive case - including the patient's prodromal phase and subsequent progression of the disease in an outpatient setting utilizing telemedicine.

The goal is to call attention to the success of proactive, early empirical treatment, combining a classic corticosteroid (budesonide) administered via a nebulizer and an oral macrolide antibiotic known as clarithromycin (Biaxin).

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SARS-Cov-2 and the Case for Empirical Treatment

Richard P. Bartlett, MD [α] & Alexandria Watkins, DNP [σ]

Summary- As of June 17, 2020, Google Trends reports that the topics "steroids and coronavirus" have increased +4,750%.[12] This is an outpatient case study that examines two patients in the United States with unique cases that involve oncology and Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), also known as COVID-19. This case study aims to reveal the identification process, diagnosis, clinical course, and management of such a distinctive case - including the patient's prodromal phase and subsequent progression of the disease in an outpatient setting utilizing telemedicine.

The goal is to call attention to the success of proactive, early empirical treatment, combining a classic corticosteroid (budesonide) administered via a nebulizer and an oral macrolide antibiotic known as clarithromycin (Biaxin).

I. Introduction

A classic drug and a novel case, it is a story out of a Disney playbook - *Beauty and The Beast.*[41] A beauty named budesonide and a beast named SARS-CoV-2. Budesonide, a drug initially patented in 1973 and on the World Health Organization's (WHO) List of Essential Medicines, and SARS-CoV-2 first presenting itself in the United States on January 20, 2020.[8 & 46] This is a case study that demonstrates the effectiveness of treating a respiratory disease with a pinpoint focused nebulized therapy versus systemic therapy. One can go as far back as ~1554 BC and find that even the ancient Egyptians had an appreciation for the therapeutic effects of sequestered aerosol inhalation.[38] The aim of pinpoint focused treatment is to find specific targets and treat effectively with minimal side effects. 'Work smarter, not harder' is an underlying theme with early, pinpoint focused empirical treatment.

Like asthma, SARS-CoV-2 is a form of a respiratory inflammatory disease that is more severe and acts on the angiotensin-converting enzyme (ACE) receptors of the lungs. SARS-CoV-2 presents as a local vascular problem due to the activation of B1 receptors on endothelial cells within the lungs - B1 receptors increase the response to proinflammatory cytokines. This activation takes place when the angiotensin-converting enzyme 2 (ACE2) acts as a receptor, permitting the spike protein of SARS-CoV-2 to bind to host cells. When ACE2 is interrupted, and the ligands of B1 are active, the lung environment is predisposed to vascular leakage and angioedema – rapid swelling in the mucosa. The primed spike protein is also allowed viral entry and spread by the transmembrane protease, serine 2 (TMPRSS2).[24, 34 & 43] Multiple studies agree with our discovery that inhaled corticosteroids (ICS) via nebulizer permit for localized down- regulation of proinflammatory cytokine synthesis and decreased expression of ACE2 (receptor of SARS-CoV-2) and TMPRSS2, thus reducing mortality.[15, 23, 24, 28, 34 & 49] For this reason, this case study postulates that focused treatment with nebulized budesonide has clinical significance over systemic corticosteroids and does not increase the risk of infection with SARS-CoV-2.2, [24 & 30] This case study supports early empirical treatment in symptomatic patients.

II. Methods

a) Study Population, Setting, and Data Collection

This case study involves two patients in the outpatient setting - treated via telemedicine, with laboratory-confirmed SARS-CoV-2 infection in the West Texas region between March 29th, 2020, and May 14th, 2020. The cases presented are confirmed SARS-CoV- 2 positive cases as defined by a positive result on a reverse-transcriptase-polymerase- chain-reaction (RT-PCR) assay of a specimen collected on a nasopharyngeal swab.

The two identified adults were identified and managed through telemedicine by a primary care provider in an outpatient family medicine practice.

Informed consent for medical records release was obtained through password-protected emails, and patients were interviewed by phone.

III. Case Report

The first patient is a 63-year-old female, non-smoker, who is diagnosed with Waldenstrom's Macroglobulinemia (2012) and Primary Cutaneous Marginal Zone Lymphoma (2020) and currently being treated with ibrutinib (Imbruvica). The patient also has a history of hypertension and hypothyroidism; treatment for these comorbidities includes losartan potassium 50mg tab once-daily, and levothyroxine 50mcg tab once- daily respectively. The patient reports complete isolation until May 7th, 2020, when her family visited, this

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is the initial exposure date. On May 10th, 2020, the patient became symptomatic with sinus cavity pressure, fever, aches, and chills. In the early morning hours of May 11th, the patient had multiple episodes of nausea and vomiting and, by that evening, had fever greater than 100.4□F, constant chills, unproductive cough, decreased appetite related to change in taste and smell. The patient remand symptomatic and continued to self-isolate until May 15th, she received news that she had been exposed to a family member on May 7th, that tested positive for SARS-CoV-2. Upon hearing the report, the patient reached out via telemedicine to an outpatient family medicine doctor. The patient was tested for SARS-CoV-2 via nasopharyngeal swab using a reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assay. At this time (May 15th, 2020), the patient was empirically started on budesonide 0.5mg nebulizer twice daily, clarithromycin (Biaxin) 500mg tab twice daily for ten days, Zinc 50mg tab twice daily, and aspirin 81mg tab daily. The patient reported for the next two-days, symptoms improved once nebulized budesonide had been administered. By May 19th, the patient developed a productive cough, pleuritic pain, and diarrhea. On May 20th, the patient's RT-PCR assay for SARS-CoV-2 was confirmed positive, ten days after initial symptoms. A telemedicine consult was performed the same day (May 20th), and budesonide administration was increased from twice daily to three times daily. The patient reports that on May 24th, symptoms started to improve, and on May 25th, the patient completed the clarithromycin (Biaxin) prescription and notes that this was the first day of no fevers. As the patient continued to remain symptom-free, a second RT- PCR assay was ordered via telemedicine on May 29th, and on June 2nd, the patient was still positive for SARS-CoV-2; this is 24-days from initial symptoms. On June 8th, the patient had been symptom-free for 14-days, a third RT-PCR assay was ordered via telemedicine, and on June 10th, the patient received their first negative result for SARS- CoV-2. A fourth RT-PCR assay was ordered on June 11th, via telemedicine, and on June 17th, the patient received a second negative result. The patient has remained symptom-free, and as of June 11th, has no longer needed nebulized budesonide therapy.

Assumed Initial Exposure Date: May 7, 2020 Empirical Treatment Start Date: May 15, 2020	
Test Date:	**Result and Date Received:**
May 15, 2020	Positive – May 20, 2020
May 29, 2020	Positive – June 2, 2020
June 8, 2020	Negative – June 10, 2020
June 11, 2020	Negative – June 17, 2020

The second patient is a 38-year-old male, non-smoker, who has the following comorbidities: Type II Diabetes Mellitus (DM), hypertension, and gout. The patient takes Metformin 1,000mg tab, twice daily and Pioglitazone 15mg tab, daily for Type II DM, Lisinopril 2.5mg tab, daily for hypertension, and Probenecid 500mg tab, daily for gout.

The patient believes initial exposure was in Frisco, TX, on March 7th, 2020, while shopping at a shopping center. On March 29th, 2020, the patient became symptomatic with cough, sore throat, loss of smell and taste, fever (>100.4°F), aches, and chills.

March 29th, the patient was tested for Influenza using the rapid influenza diagnostic test (RIDT), the test was negative, and the patient was discharged home. At this time, the patient accessed his primary care doctor via telemedicine, he was treated empirically and started on budesonide 0.5mg nebulizer twice daily, clarithromycin (Biaxin) 500mg tab twice daily for 10 days, Zinc 50mg tab twice daily, and aspirin 81mg tab daily. April 1st, 2020 (three days after onset of symptoms), the patient was able to undergo SARS-CoV-2 testing, he was tested by nasopharyngeal swab using an RT-PCR assay. On April 3rd, the patient was informed that he had tested positive for SARS-CoV-2, six days after initial symptoms had ensued. The patient reports that he was symptom-free April 4th, and completed his full round of clarithromycin (Biaxin) on April 7th. The patient continued budesonide 0.5mg nebulizer twice daily, Zinc 50mg tab twice daily, and aspirin 81mg tab daily. As the patient continued to remain symptom-free, a second RT- PCR assay via nasopharyngeal swab was ordered via telemedicine on April 15th ending with a positive result for SARS-CoV-2. At this time azithromycin 500mg tab on day one, then 250mg tab, daily for four-days was started. On April 27th, the patient was re-tested via RT-PCR assay and again tested positive. It was not until May 1st that the patient tested negative per the nasopharyngeal swab

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RT-PCR assay. On May 7th, the patient was tested with another RT-PCR assay by nasopharyngeal swab to confirm the negative test result but tested positive for SARS-CoV-2. The patient had no new exposure and been self-quarantined since April 1st. The patient was re-screened again by nasopharyngeal swab using RT-PCR May 11th and tested negative for SARS-CoV-2. The patient completed a total of four rounds of Azithromycin 500mg tab on day one, then 250mg tab, daily for four-days, and stopped budesonide 0.5mg nebulizer twice daily, May 13th. He continued Zinc 50mg tab twice daily, and the aspirin 81mg tab daily, until a second consecutive negative was obtained. On May 14th, the last test that was performed on the patient was the nasopharyngeal swab using an RT-PCR assay and again confirmed a negative result.

March 29, 2020	
Test Date:	**Result and Date Received:**
April 1, 2020	Positive – April 3, 2020
April 15, 2020	Positive – April 19, 2020
April 27, 2020	Positive – April 27, 2020
May 1, 2020	Negative – May 3, 2020
May 7, 2020	Positive – May 10, 2020
May 11, 2020	Negative – May 13, 2020
May 14, 2020	Negative – May 15, 2020

IV. Discussion

a) Budesonide

Since the outbreak of the novel SARS-CoV-2 infection, there have been inconsistencies in the information that has been disseminated regarding the potentially deleterious effect of treating patients with corticosteroids, nonsteroidal anti-inflammatory drugs (NSAIDs), and non-NSAIDs. Nonsteroidal anti-inflammatory drugs induce their intrinsic inhibitory functions on the cyclooxygenase enzymes (COX-1/COX-2). These enzymes are involved in the synthesis of crucial biological mediators - mediators that regulate inflammation. Corticosteroids, such as budesonide, participate in several basic physiological processes such as aiding in immune system response and inflammatory regulation. Budesonide destabilizes the messenger RNA (mRNA) of the inflammatory gene, COX-2, by blocking the protein synthesis, thus suppressing the transfer of genetic information that allows for inflammation to take place.[5]

Corticosteroid pretreatment abates cytokine stimulation significantly by reducing both inflammatory mediators' cytosolic phospholipase A2 (cPLA2) and COX-2 mRNA status as well as prostaglandin (PGE) release. The physiological effect of budesonide in reducing PGE production occurs primarily at the mRNA level by preventing the launch of cPLA2 and particularly COX-2.[29] Using nebulized budesonide early on in the treatment plan of symptomatic SARS-CoV-2 patients is valuable when trying to avoid an overreaction of the immune system causing a 'cytokine storm' – a response that wreaks havoc on healthy cells rather than incapacitating the virus.

Budesonide represents the first example of a drug able to inhibit the production of proinflammatory cytokines/chemokines like IL-6, IL-8, and TNF-α from human lung macrophages activated by secretory phospholipids A2 (sPLA2).[40] Corticosteroids like budesonide were universally used during the SARS-CoV outbreak because of their recognized ability to regulate a variety of involved cytokines (including IL-1, IL-3, IL-4, IL-5, IL-6, IL-8, IL-11 IL-12, IL-17A GM-CSF, and TNF-α).[11, 23, 33, 36 & 50] Research shows that early intervention with ICS like budesonide decreases the need for systemic corticosteroid use. Inhaled corticosteroids modestly improve airflow function.[32 & 51] According to Russell et al., there is no "definitive evidence" that establishes a stance on the use of NSAIDs for the treatment of SARS-CoV-2. Still, there is evidence that corticosteroids can produce favorable results in the treatment of SARS-CoV.[36] Oncology patients who are immunocompromised benefit from prescribed low-dose corticosteroids.[9 & 36] There is also a decreased risk of pneumonia in COPD patients who use nebulized budesonide.[16] In contrast, when systemic corticosteroids were used in SARS-CoV-2 hospital patients there was no evidence of shortened pneumonia duration, decrease in days stayed in the hospital, or reduced risk of mortality.[48] This case study has affirmed that an empirical treatment protocol with nebulized budesonide and the efficacy of treating symptomatic patients earlier rather than later has significant implications. Halpin et al. is in agreeance with early management and encourages increased dosing with ICS for SARS-CoV-2 patients.[17] The treatment plan

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has evolved and become more effective by increasing the dosage and frequency of nebulized budesonide.

Budesonide has proven to be useful in the prevention of asthma (an inflammatory disease in the lungs), and when regularly used, budesonide has shown to decrease the severity and number of asthma attacks. SARS-CoV-2 is a much more severe form of inflammatory disease in the lungs with the primary source of infection at the ACE receptors in the lungs. It is important to note that for asthmatics who are having an acute inflammatory response and people with late symptoms of SARS-CoV-2, budesonide is ineffective. Hence, routine daily treatment of budesonide ICS for asthmatics and early empirical nebulized treatment is critical for SARS-CoV-2 patients. The use of inhaled budesonide has also been shown to be beneficial in the airway epithelial cells by inhibiting the virus-induced cytokines, thymic stromal lymphopoietin (TSLP), and chemokine ligand 26 (CCL26).[18] The inhibition of these cytokines indicates that inhalation of budesonide via nebulizer after SARS-CoV-2 contagion has favorable effects.

Another advantage to nebulized budesonide is that the systemic half-life (the time it takes a drug to decrease to half its initial dose) is much shorter than that of fluticasone propionate. It is understood that budesonide has low lipophilicity relative to other corticosteroids and has a more preferential reversible esterification process, thus extending the exposure in the lungs.[10] It is because of this knowledge and the lung's preference for inhaled budesonide; SARS-CoV-2 patients have been empirically treated with nebulized budesonide.

b) Nebulizer and Concerns of SARS-CoV-2 Transmission

Nebulizers are very effective at treating breathing disorders like SARS-CoV-2, but concerns of spreading particles in size up to 5 μm via aerosol cause concern for providers when considering what route to order for respiratory medications. This case study is focused on treatment in the outpatient setting, and therefore, there are different considerations when examining the efficacy of nebulized therapy. Small-Volume Nebulizers (SVNs) offer several advantages for drug delivery: nebulization delivers higher targeted drug concentrations in the airways achieving rapid onset of action, nebulized corticosteroids can be dosed at considerably lower doses than oral or intravenous alternatives, and there is minimal systemic absorption with nebulized corticosteroids hence, fewer adverse effects.[7 & 14] In 2004, a study evaluated the distribution of airborne SARS-CoV in hospital patients who were being treated with a combination of humidified oxygen therapy and nebulizers. The study observed that zero percent of the offending pathogen in the air and environmental samples after a PCR amplification was performed in isolated rooms.[43] This study does not coincide with the consensus that using a nebulizer might be a transmitting source for SARS. Deslée et al.and the French Language Respiratory Society note that there is no evidence to support avoiding using ICS (nebulized budesonide) during the SARS-CoV-2 pandemic.[13] The American College of Allergy, Asthma, and Immunology and Dr. Xi of Keck Medicine of USC suggests that nebulized medications should be administered in a room of the patient's house that is isolated from other household members to minimize exposure.[1 & 46] The goal is to use a nebulizer in a part of the house where there is no recirculated air or in areas with low foot traffic. It is suggested that patients use nebulizers in an area where it is easy to clean the surfaces, such as a private bathroom or an area that needs no cleaning at all—for instance, the garage or outside on the patio if practical. When cleaning a surface after a nebulization treatment, one can use a disinfectant wipe or a water-absorbent paper towel. It has been shown that more than 95% of the residue left on a surface after a nebulization treatment can be removed with regular water- absorbent tissue paper.[22] For the remaining percentage left on the service, it is not guaranteed that infection will follow if the residue reaches another susceptible individual.[39] Collaboration between the healthcare provider and patient, along with continued patient education is vital when prescribing nebulized medication in cases with high contagion risk.

There has to be a big push for educating the patient and all parties involved in the patient's care on appropriate device cleaning and aerosol therapy infection control. According to O'Malley[31], the recommended steps for nebulizer cleaning and disinfecting in the home include:

1) Nebulizer parts cleaned with dish detergent and water
2) Disinfect (per manufacturer approval and patient approval)
   a) Cold techniques:
      i) Soak for five minutes in 70% isopropyl alcohol
      ii) Soak for 30 minutes in 3% hydrogen peroxide
   b) Heat techniques:
      i) Microwave or Boil for five minutes
      ii) If patient has a dishwasher that can achieve a temperature of > 158°F or 70°C, it is okay to wash in a dishwasher for 3x0 minutes
      iii) Electric steam sterilizer
3) The patient will need to rinse with sterile water if using the cold disinfectant technique
4) Air-dry before storing equipment

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As always, reinforcing good hand hygiene before and after nebulized therapy is crucial when being proactive in stopping the spread of SARS-CoV-2.

c) Supportive Therapy

i. *Clarithromycin*

Biaxin, also known as clarithromycin, is a macrolide that is metabolized in the liver and primarily excreted in the urine. Biaxin inhibits the growth of atypical pathogens and is commonly prescribed to treat bacterial infections and community-acquired pneumonia (affects the lower respiratory tract). The protocol calls for Biaxin to treat atypical pneumonia prophylactically – pneumonia is a known complication of SARS-CoV-2.

When patients with SARS-CoV-2 exchange oxygen (take a breath), they allow the insulting agent to crossover into the bloodstream, thus introducing the alveoli (small air sacs in the lungs) and surrounding tissue to SARS-CoV-2. This exchange, along with inflammation, causes an accumulation of dead cells and fluid, thus leading to pneumonia.

ii. *Aspirin*

Early aspirin use curtails the incidence of cardiovascular complications, mitigates prothrombotic states, reduces the extent of SARS-CoV-2 in severe and critical patients, and will conceivably shorten days in the hospital.[26 & 35] Prophylactic use of aspirin in SARS-CoV-2 patients has the potential to inhibit viral replication, anti-inflammatory, and anti-lung injuries, as well as anti-platelet aggregation.

iii. *Zinc*

Zinc administration prophylactically restores depleted immune cell function and has the potential to enhance antiviral immunity. Zinc diminishes the RNA-synthesizing activity of SARS-CoV-2.[21 & 37] Zinc protects the cell membrane, which in return, assists in blocking viral entry into the cell and is an essential component; zinc is a naturally occurring mineral.

d) False-Negative Covid-19 Test and Empirical Treatment

In healthcare, tests are used to guide our decision making not be our only decision- making tool. It is imperative to note that the "art of medicine" requires us to 'treat the patient, not the test.' New studies show that if SARS-CoV-2 PCR testing takes place within the first five days post-exposure, the patient has a greater than 65 percent chance of receiving a false-negative result, and the average patient that was symptomatic within the first five days of exposure had a false-negative rate of almost 40 percent.[19, 20 & 42] The consequences of not treating someone who truly has SARS-CoV-2 because they test negative instead of positive can be detrimental to the patient and society as a whole.

Real-Time Reverse-Transcriptase Polymerase Chain Reaction (RT-PCR) test had the best performance eight days after contagion (on average, the patient was symptomatic on day three), but our best still had a false-negative rate of 20 percent – this equates into one in five people with false-negative test results.[19, 20 & 42] High-risk exposure patients and patients who are immune compromised should be cared for as if they have SARS-CoV-2 until proven otherwise when symptoms are consistent with SARS-CoV-2. In case one and case two had early empirical treatment not been started, the patient would have lost five days and six days of therapy, respectively; thus, diminishing chances of survival. In case two had the patient stopped his treatment on May 3rd instead of May 15th because of a "potential false-negative," he would have missed 12 days of treatment, potentially exposing him to disease proliferation.

V. Conclusions

It should be mentioned that telemedicine has been put to the test during these trying times. The success of these two cases and the safety permitted by monitoring remotely and providing real-time consultations by phone could not have been achieved without the integration of telemedicine. This experience has enabled us to witness the advancement of technology in medicine personally.

Inhaled corticosteroids are a powerful tool. The evidence is currently under review in regards to the precision and power that inhaled corticosteroids possess; these studies are being performed by France[4], Spain[44], Sweden[6] the University of Oxford[3], and the National Institutes of Health (NIH)[27]. It is our understanding that there is more than one way to treat SARS-CoV-2, but it is with great respect to the studies that have come before and will come after ours that these case studies and the treatments provided be considered in the arsenal of powerful therapies to be used when treating SARS-CoV-2. A call to arms was sounded on January 20, 2020, when the first case of SARS-CoV-2 was first identified in the United States and in March 2020 a successful empirical treatment plan was put into place (budesonide 0.5mg nebulizer, twice daily, clarithromycin (Biaxin) 500mg tab, twice daily for ten days, Zinc 50mg tab, twice daily, and aspirin 81mg tab, daily).

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The use of the Neural Network in Predicting a Number of Diseases of the Gastrointestinal Tract Caused by Parasites

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Annotation- Disorders of the functional state of the gastrointestinal tract associated with the influence of various parasites are considered. The symptoms of diseases caused by parasites and their location in the gastrointestinal tract are given. The possibility of using neural network technology in diagnosing diseases as a result of the influence of various parasites is estimated. The structure of the neural network is given, indicating the set of inputs and outputs, as well as the result of training the network. For the created neural network, test results for the corresponding symptoms and disease prediction results for these symptoms were obtained.

Keywords: gastrointestinal tract, parasites, symptoms, neural network, structure, testing, prediction, error.

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The use of the Neural Network in Predicting a Number of Diseases of the Gastrointestinal Tract Caused by Parasites

U. N. Musevi [α], K. S. Pashayeva [σ] & N. T. Abdullayev [ρ]

Annotation- **Disorders of the functional state of the gastrointestinal tract associated with the influence of various parasites are considered. The symptoms of diseases caused by parasites and their location in the gastrointestinal tract are given. The possibility of using neural network technology in diagnosing diseases as a result of the influence of various parasites is estimated. The structure of the neural network is given, indicating the set of inputs and outputs, as well as the result of training the network. For the created neural network, test results for the corresponding symptoms and disease prediction results for these symptoms were obtained.**

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I. Introduction

Often, a violation of the functional state of the gastrointestinal tract (GIT) is associated with the influence of various parasites. Parasites have a more complex structure and have well-oiled defense mechanisms directed against the human immune system (encapsulation, antigenic mimicry, antigenic "drift", inactivation of enzymes and biologically active substances, etc.), which allows them to exist for a long time in various human organs and tissues ... In addition, there are objective difficulties in identifying, isolating and obtaining immunoreagent specific antigens of parasites. So, for example, the immune response in giardiasis is largely due not to the surface proteins of the parasite, but to antigens that enter the human body along with the products of their vital activity. Thus, in the laboratory diagnosis of many parasites, serological research methods are only of auxiliary value [1].

The World Health Organization has proven that 95% of humanity has a variety of parasites in the body. These living organisms are not as harmless and safe as it might seem in the first place. Most of them are localized in the organs of the gastrointestinal tract (the eggs of the worms get here along with contaminated water and food), but there are also so-called extra intestinal forms of invasion - parasites can live in the lungs, heart and even the human brain [2].

II. Immune Disorders and Disease Symptoms

Parasites weaken the immune system, lowering the release of immunoglobulin, and their presence constantly stimulates the system's response and, over time, can weaken this vital immune mechanism, opening the way for bacterial and viral infections to enter the body.

These symptoms are just a few of them. In reality, the symptoms of diseases caused by parasites in the digestive tract are more extensive. The most difficult thing about this is that these symptoms of different diseases are very close and require additional techniques to clarify the diagnosis.

Probable etiological factors of gastrointestinal tract dysfunction are mainly parasites: *Entamoeba, Giardia lamblia, Balantidium coli, Ascarislumbricoides, Enterobiusvermicularis, Taeniasolium (saginata), Strongyloidesstercoralis, Cryptosporidiumparvum* [3].

Table 1: Location of parasites in the gastrointestinal tract

Types of parasites	Habitat	Source
Entamoeba	large intestine	[4]
Giardialamblia	small intestine	[5]
Balantidiumcoli	large intestine	[6]
Ascarislumbricoides	small intestine	[7]
Enterobius vermicularis	cecum or appendix, small intestine, colon	[8]
Taenia solium (*saginata*)	small intestine	[9]

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Strongyloides stercoralis	duodenum, lean intestine	[10]
Cryptosporidium parvum	small intestine	[11]
Echinostoma	small intestine	[12]

Colitis is an inflammation of the colon, observed in a number of diseases, namely, in chronic inflammatory bowel diseases, pseudomembranous colitis and infections caused by bacteria, parasitic protozoa (amoeba) and viruses. Irritable bowel syndrome, otherwise called mucosal or spastic colitis, is not associated with inflammation of the colon, although it has similar symptoms [13].

The causative agent of giardiasis in humans is *Lambliaintestinalis (Giardia intestinalis, Giardia lamblia)*. *Giardiasis* is a fairly widespread invasion throughout the world that affects all age groups, but children suffer from this disease more often than others. [14]

Balantidium coli is a type of ciliates parasitizing in the large intestine of some mammals: as a rule, in pigs, less often in rats, dogs, and also in humans. Causes a disease called balantidiasis, or ciliated dysentery. [6]

Ascariasis- intestinal invasion from the group of nematodes, the causative agents of which are roundworms (*Ascarislumbricoides*). *Ascaris* parasitizes in small intestine. [7]

Enterobiasis is an intestinal invasion by the pinworm Enterobiusvermicularis, usually found in children. [15]

Cysticercosis is the most common parasitic disease of the central nervous system. The invasion of the central nervous system by the larvae of the pork tapeworm *Taeniasolium* occurs when eating food contaminated with helminth eggs. [16]

Strongyloidosis is an invasion caused by *Strongyloidesstercoralis*. [15]

Cryptosporidiosis is a parasitic disease caused by protists of the genus *Cryptosporidium* from the Apicomlex type. *Cryptosporidiosis*, as a rule, manifests itself as an acute and short-term infection and is spread by the alimentary route, often through contaminated water. [17].

Echinostoma infect the gastrointestinal tract in humans, and can cause a disease known as *echinostomosis* [18].

Table 2: Symptoms and diseases associated with major gastrointestinal parasites

№	Symptoms	*Shortening*	Parasites of Gastrointestinal Tract								
			Entamoeba	*lamblia*	*Coli*	*lumbricoides*	*Enterobius vermicularis*	*solium(sagi)*	*sstercoralis*	*Cryptosporid iumparvum*	*Echinostoma*
1	Intensity invasions	II	+			+	+				+
2	Violations intestinal peristalsis	VIP	+				+				
3	Immunodeficiency	ID	+						+	+	
4	Fasting	Fast	+				+				
5	Stress	ST	+				+		+		
6	Perforation intestines	PI	+		+						
7	Intestinal bleeding	IB	+		+	+			+	+	+
8	Tumor overgrowth in the wall of the large intestine	TLI	+								
9	Amoebic intestinal structure	AIS	+								
10	Pain, bloating and rumbling in the stomach	PBRSt		+	+				+		+
11	Increased gassing	IG		+							
12	Vomiting, nausea	VN	+	+				+	+	+	

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13	Magnification of the amount of undigested fat in feces	MFF		+						+	
14	Dysbacteriosis	DB		+							
15	Loss of appetite	LA		+		+	+	+	+		
16	Allergy	Aller		+			+		+		
17	Diarrhea	Diar			+			+	+		+
18	Spasm and soreness of the large intestine	SBLI			+	+	+				
19	Fever	Fev			+					+	
20	Slimming	Slim			+				+		+
21	Irritation peritoneum	IP			+			+			
22	Insomnia	Inso					+				
23	Stomach pains	StP								+	
24	Diarrhea	Diar								+	+
25	Disease associated with		Colitis	Giardiasis	Balantidiasis	Ascariasis	Enterobiasis	Cysticercosis	Strongyloidosis	Cyposporitosdiosis	Echinostomosis

III. A Neural Network Model for Predicting Gastrointestinal Diseases Caused by Parasites

Artificial neural networks are effectively used in the diagnosis of various diseases [19, 20]. Neural network technologies are also used for the diagnosis of diseases of the gastrointestinal tract, for example, for the differential diagnosis of liver diseases [21] and in predicting the development of abdominal sepsis in patients with severe acute pancreatitis [22,23].

Let us consider the possibilities of using the processing and analysis method in medical research using a neural network to improve the accuracy in diagnosing gastrointestinal diseases as a result of the influence of various parasites.

The experiment was carried out on a NeuroPro network emulator. NeuroPro0.25 beta version allows you to implement the following basic operations:

- creation of neuroprojects;
- connect data files with a neuroproject;
- adding layer architectures to neural projects from 1 to 10 layers, with up to 100 neurons in each layer;
- train a neural network to solve forecasting and classification problems;
- testing of a neural network based on database files, calculating the significance indicators of input signals;
- simplify the neural network;
- selection of learning algorithms, determination of forecasting for a given accuracy, etc.

Setting up an experiment

A neural network that determines the prognosis of diseases using the symptoms of diseases.

For the experiment, we select the symptoms of various gastrointestinal forgetfulness, progressing with parasites. 24 symptoms were selected (at the request of doctors, the number of symptoms can be increased, since these systems are open) and 9 diseases (it should be noted that the number of diseases created by parasites is quite large, the most common of them were selected) (table 2). For the experiment, a neural network simulator NeuroPro 0.25 was used.

The input parameters of the neural network are the symptoms shown in Table 2, the set of inflows includes 9 varieties, and the output of the network will be the solution of the neural network according to the training rules. Fig. 1 shows a neural network corresponding to the first variant of the experiment.
Input parameter.

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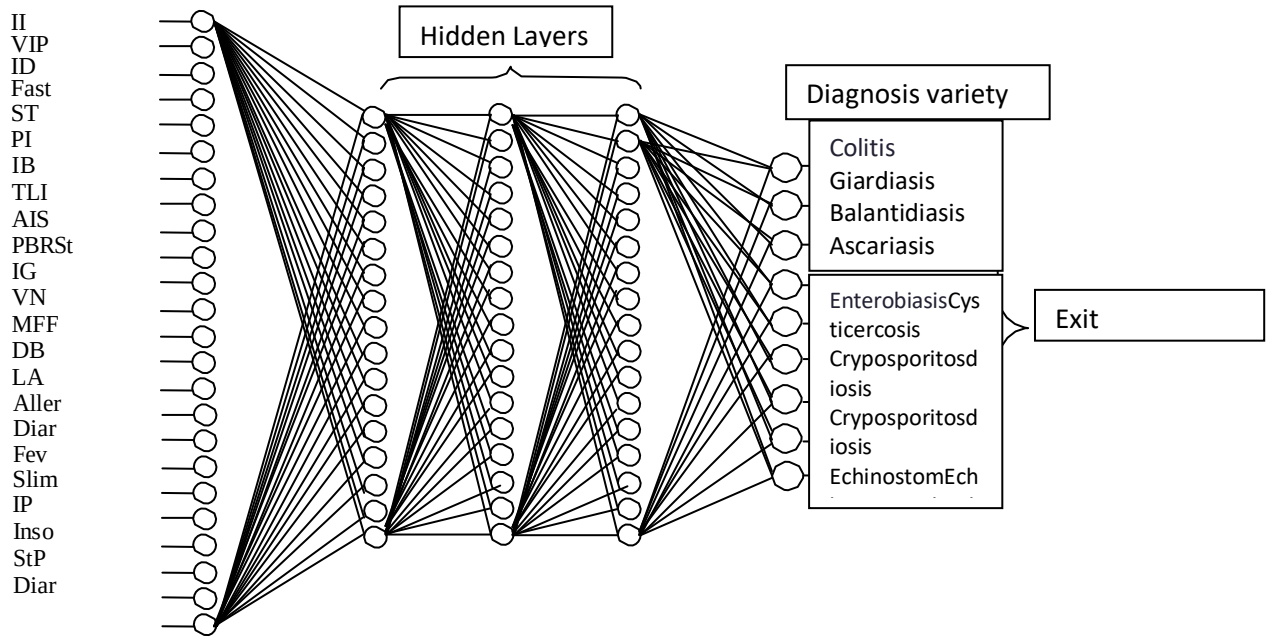

Fig. 1: Neural network corresponding to the first variant of the experiment

The preprocessing of the input database fields for feeding into the network are calculated with the following formula:

$$I=(I-a_i)/b_i,$$

where I is an input number, ai, bi are coefficients calculated for each input. Thus, preprocessing of input database fields, functional transformers and post-processing of final syndromes is carried out according to the formulas: Database fields (initial symptoms):

N1, N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19, N20, N21, N22, N23, N24

Database fields (end symptoms):

N25, N26, N27, N28, N29, N30, N31, N32, N33

Preprocessing of DB input fields for network feed:

N1=(N1-0,5)/0,5

N2=(N2-0,5)/0,5

N3=(N3-0,5)/0,5

N4=(N4-0,5)/0,5

N5=(N5-0,5)/0,5

N6=(N6-0,5)/0,5

N7=(N7-0,5)/0,5

N8=(N8-0,5)/0,5

N9=(N9-0,5)/0,5

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N10=(N10-0,5)/0,5

N11=(N11-0,5)/0,5

N12=(N12-0,5)/0,5

N13=(N13-0,5)/0,5

N14=(N14-0,5)/0,5

N15=(N15-0,5)/0,5

N16=(N16-0,5)/0,5

N17=(N17-0,5)/0,5

N18=(N18-0,5)/0,5

N19=(N19-0,5)/0,5

N20=(N20-0,5)/0,5

N21=(N21-0,5)/0,5

N22=(N22-0,5)/0,5

N23=(N23-0,5)/0,5

N24=(N24-0,5)/0,5

The sigmoid function was chosen as the activation function.
Functional converters:

Sigmoid 1 (A) = A / (0,1+ | A |)

Sigmoid 2 (A) = A / (0,1+ | A |)

Sigmoid 3 (A) = A / (0,1+ | A |)

Post-processing of end-point syndromes:

N25=((N25*1)+1)/2)

N26=((N26*1)+1)/2)

N27=((N27*1)+1)/2)

N28=((N28*1)+1)/2)

N29=((N29*1)+1)/2)

N30=((N30*1)+1)/2)

N31=((N31*1)+1)/2)

N32=((N32*1)+1)/2)

N33=((N33*1)+1)/2)

Table 3 gives a set of network inputs with corresponding symptoms.

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Table 3: Multiple network inputs with corresponding symptoms

№	Symptoms	Relevant network inputs
1	Intensity invasions	N1
2	Violations intestinal peristalsis	N2
3	Immunodeficiency	N3
4	Fasting	N4
5	Stress	N5
6	Perforation intestines	N6
7	Intestinal bleeding	N7
8	Tumor overgrowth in the wall of the large intestine	N8
9	Amoebic intestinal structure	N9
10	Pain, bloating and rumbling in the stomach of BWU	N10
11	Increased gassing	N11
12	Vomiting, nausea	N12
13	Magnification of the amount of undigested fat in feces	N13
14	Dysbacteriosis	N14
15	Loss of appetite	N15
16	Allergy	N16
17	Diarrhea	N17
18	Spasm and soreness of the large intestine	N18
19	Fever	N19
20	Slimming	N20
21	Irritation peritoneum	N21
22	Insomnia	N22
23	Stomach pains	N23
24	Diarrhea	N24

Table 4 shows the outputs of the neural network with the corresponding diseases.

Table 4: Outputs of the neural network with corresponding diseases

№	Symptoms	Relevant network outputs
1	Colitis	N25
2	Giardiasis	N26
3	Balantidiasis	N27
4	Ascariasis	N28
5	Enterobiasis	N29
6	Cysticercosis	N30
7	Strongyloidosis	N31
8	Cryposporitosdiosis	N32
9	Echinostomosis	N33

After displaying the input and output parameters of the network, the network is trained.

The analysis shows that the most optimal algorithm for learning a multilayer perceptron is the back propagation algorithm [24]. The corresponding learning outcomes, inputs and outputs, parameters are given in Fig. 2-6.

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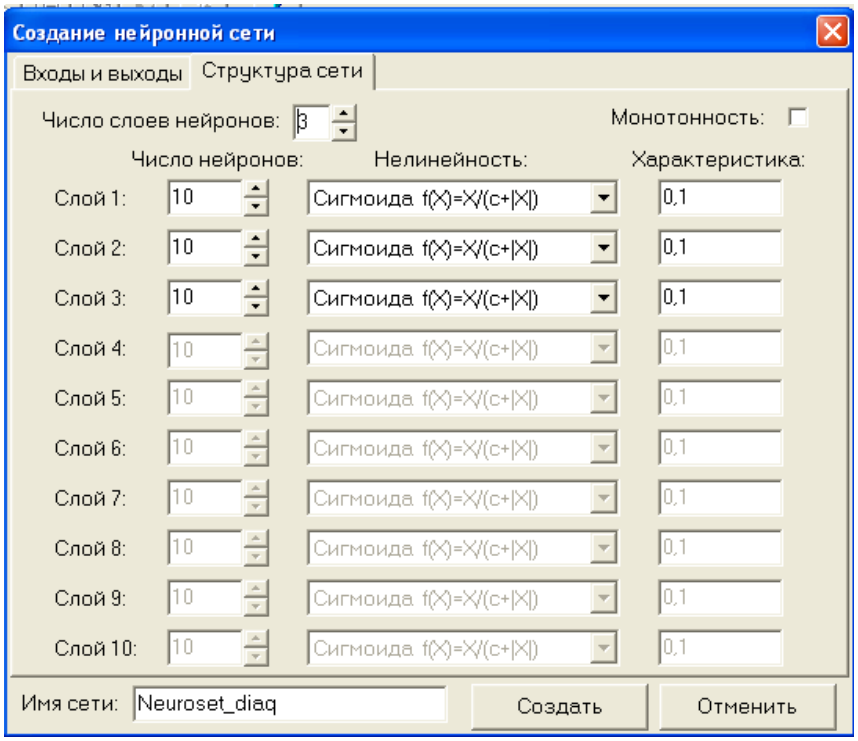

Fig. 2: The structure of the neural network

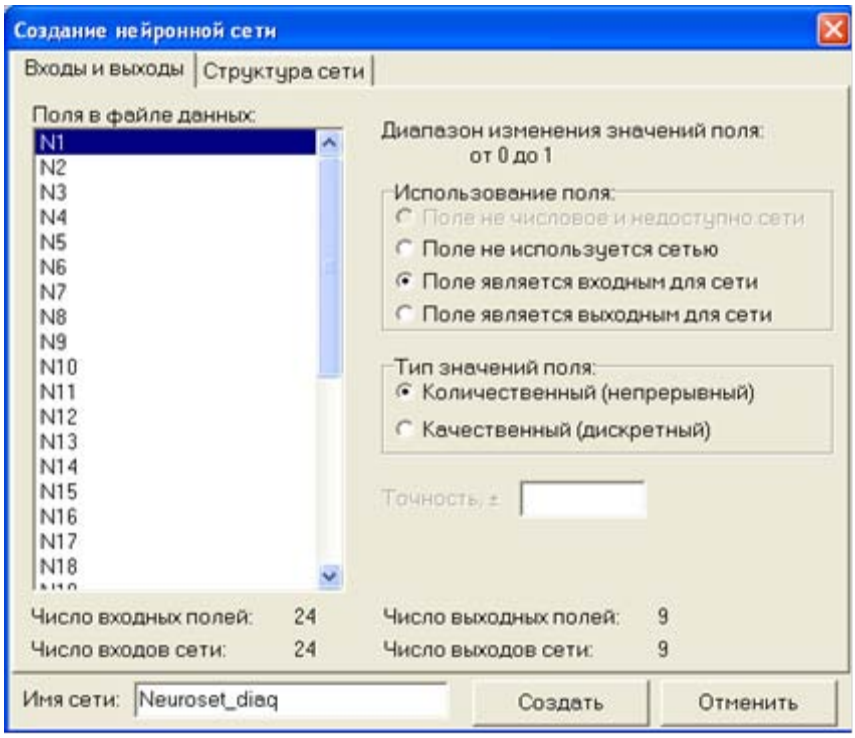

Fig. 3: Network inputs

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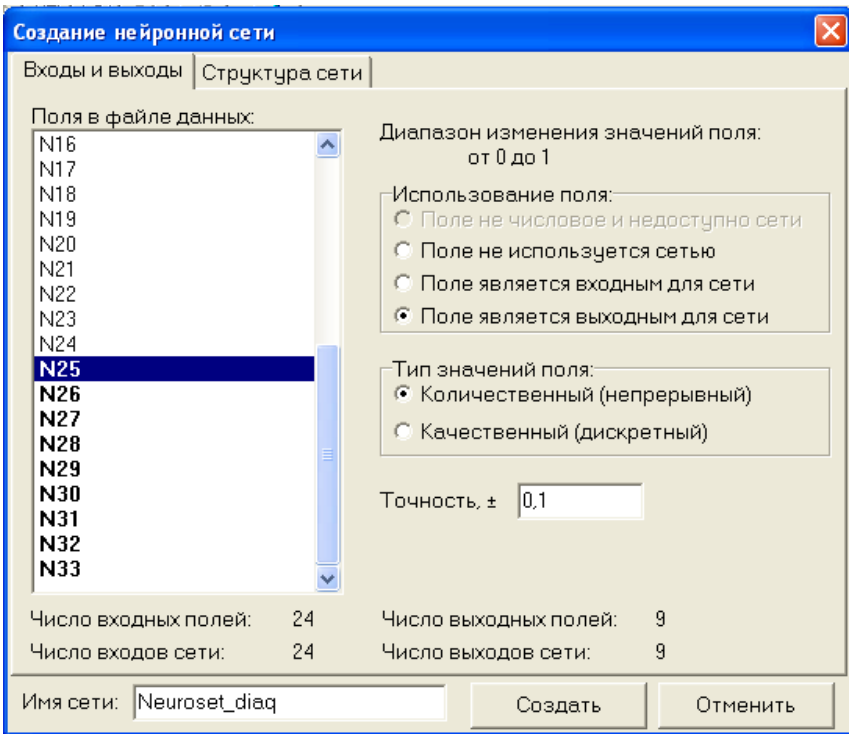

Fig. 4: Network outputs

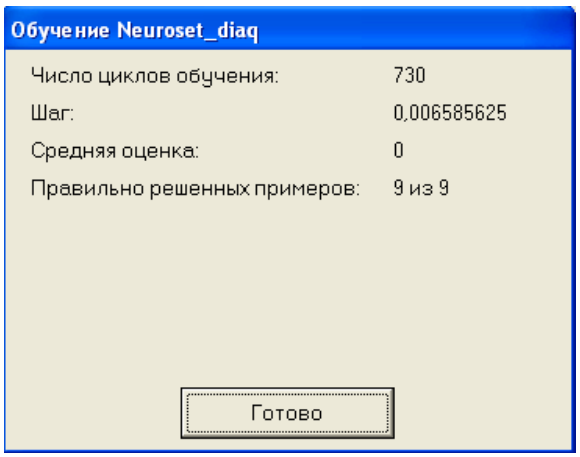

Fig. 5: Neural network training parameters

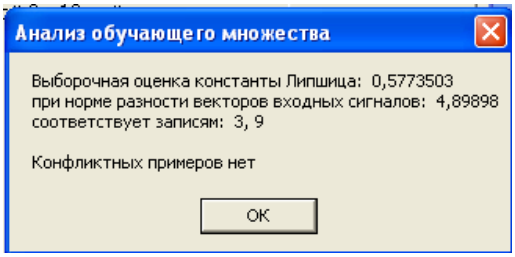

Fig. 6: Analysis of the training set

To test the created neural network, selected symptoms were selected (Table 5).

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Table 5: Input symptoms for testing

Corresponding network inputs	Symptoms
N1	Intensity invasions
N5	Stress
N6	Bowel perforation
N7	Intestinal bleeding
N10	Pain, bloating and rumbling in the stomach
N11	Increased gassing
N14	Dysbacteriosis
N17	Diarrhea
N20	Slimming
N21	Peritoneal irritation

Fig. 7-9: Shows the network prediction results for the corresponding symptoms

№	N28	Прогноз сети	Ошибка	N29	Прогноз сети	Ошибка	N30	Прогноз сети	Ошибка
1	0	0,09344602	-0,09344602	0	0,0925135	-0,0925135	0	0,09490025	-0,09490025
2	0	0,03497162	-0,03497162	0	0,05648446	-0,05648446	0	0,09930319	-0,09930319
3	0	-0,09095228	0,09095228	0	0,08263764	-0,08263764	0	0,01090771	-0,01090771
4	1	0,9196365	0,08036351	0	0,05327278	-0,05327278	0	-0,09202719	0,09202719
5	0	0,0143829	-0,0143829	1	0,9450069	0,05499309	0	-0,0783869	0,0783869
6	0	0,08602086	-0,08602086	0	0,04222867	-0,04222867	1	0,9099151	0,09008491
7	0	0,01971248	-0,01971248	0	-0,09407657	0,09407657	0	-0,09986526	0,09986526
8	0	0,08959022	-0,08959022	0	0,03864676	-0,03864676	0	0,02319735	-0,02319735
9	0	0,08467203	-0,08467203	0	-0,05847192	0,05847192	0	-0,08407497	0,08407497
10		-0,1610576			0,1938157			-0,1561767	
		Правильно:	9 (100%)		Правильно:	9 (100%)		Правильно:	9 (100%)
		Неправильно:	0 (0%)		Неправильно:	0 (0%)		Неправильно:	0 (0%)
		Всего:	9		Всего:	9		Всего:	9
		Ср.ошибка:	0,06601243		Ср.ошибка:	0,06370282		Ср.ошибка:	0,07474975
		Макс.ошибка:	0,09344602		Макс.ошибка:	0,09407657		Макс.ошибка:	0,09986526

Fig. 7: Network forecast for outputs N25-N27

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№	N28	Прогноз сети	Ошибка	N29	Прогноз сети	Ошибка	N30	Прогноз сети	Ошибка
1	0	0,09344602	-0,09344602	0	0,0925135	-0,0925135	0	0,09490025	-0,09490025
2	0	0,03497162	-0,03497162	0	0,05648446	-0,05648446	0	0,09930319	-0,09930319
3	0	-0,09095228	0,09095228	0	0,08263764	-0,08263764	0	0,01090771	-0,01090771
4	1	0,9196365	0,08036351	0	0,05327278	-0,05327278	0	-0,09202719	0,09202719
5	0	0,0143829	-0,0143829	1	0,9450069	0,05499309	0	-0,0783869	0,0783869
6	0	0,08602086	-0,08602086	0	0,04222867	-0,04222867	1	0,9099151	0,09008491
7	0	0,01971248	-0,01971248	0	-0,09407657	0,09407657	0	-0,09986526	0,09986526
8	0	0,08959022	-0,08959022	0	0,03864676	-0,03864676	0	0,02319735	-0,02319735
9	0	0,08467203	-0,08467203	0	-0,05847192	0,05847192	0	-0,08407497	0,08407497
10		-0,1610576			0,1938157			-0,1561767	
		Правильно:	9 (100%)		Правильно:	9 (100%)		Правильно:	9 (100%)
		Неправильно:	0 (0%)		Неправильно:	0 (0%)		Неправильно:	0 (0%)
		Всего:	9		Всего:	9		Всего:	9
		Ср.ошибка:	0,06601243		Ср.ошибка:	0,06370282		Ср.ошибка:	0,07474975
		Макс.ошибка:	0,09344602		Макс.ошибка:	0,09407657		Макс.ошибка:	0,09986526

Fig. 8: Network forecast for outputs N28-N30

№	N31	Прогноз сети	Ошибка	N32	Прогноз сети	Ошибка	N33	Прогноз сети	Ошибка
1	0	0,08795309	-0,08795309	0	-0,09518129	0,09518129	0	0,09196231	-0,09196231
2	0	0,09350526	-0,09350526	0	-0,09076416	0,09076416	0	0,04720494	-0,04720494
3	0	-0,08714956	0,08714956	0	0,09191668	-0,09191668	0	0,06026587	-0,06026587
4	0	-0,09295678	0,09295678	0	0,05985516	-0,05985516	0	-0,0613662	0,0613662
5	0	-0,07158798	0,07158798	0	0,09467661	-0,09467661	0	-0,09070551	0,09070551
6	0	-0,08079088	0,08079088	0	0,08758733	-0,08758733	0	0,0726791	-0,0726791
7	1	0,9438573	0,05614275	0	0,09416613	-0,09416613	0	-0,03318572	0,03318572
8	0	0,07193917	-0,07193917	1	0,9065436	0,09345639	0	0,04501843	-0,04501843
9	0	0,07772183	-0,07772183	0	0,09204635	-0,09204635	1	0,9151728	0,08482718
10		0,3709661			0,07566229			0,4827752	
		Правильно:	9 (100%)		Правильно:	9 (100%)		Правильно:	9 (100%)
		Неправильно:	0 (0%)		Неправильно:	0 (0%)		Неправильно:	0 (0%)
		Всего:	9		Всего:	9		Всего:	9
		Ср.ошибка:	0,07997192		Ср.ошибка:	0,08885002		Ср.ошибка:	0,06524614
		Макс.ошибка:	0,09350526		Макс.ошибка:	0,09518129		Макс.ошибка:	0,09196231

Fig. 9: Network forecast for outputs N31-N33

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Table 6 shows the results of a neural network for predicting diseases by symptoms.

Table 6: Neural network results

№	Symptoms	Relevant network outputs	Network forecast
1	Colitis	N25	-0.1516073
2	Giardiasis	N26	0.1060389
3	Balantidiasis	N27	0.3889541
4	Ascariasis	N28	-0.160576
5	Enterobiasis	N29	0.1938157
6	Cysticercosis	N30	-0.1561767
7	Strongyloidosis	N31	0.3709661
8	Cryposporitosdiosis	N32	0.07566229
9	**Echinostomosis**	**N33**	**0.4827752**

IV. Conclusion

Thus, an effective type of structure of an artificial neural network designed to solve problems of medical diagnostics and prognosis is a perceptron with sigmoid activation functions, the input of which is information about the symptoms of a patient's diseases, and the output is a diagnosis of the disease. According to the results obtained by the neural network, it is possible to confidently clarify the disease that corresponds to the "Echinostomosis" output, created by parasites of the small intestine, which as a result leads to a violation of the functional state of the gastrointestinal tract.

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Optimization of Decision Variables (DVs) in Products Mix of Foams Manufacturing Companies in Gombe State

By Wirnkar, A. D.
Gombe State University

Abstract- The economic state of Nigeria warrants judicious use of scarce resources more than ever before. It is not understood if foam producing companies in Gombe state are operating optimally in the attainment of value creation for stakeholders. The research adopted a survey and exploratory research design. The primary source of data collection was used. The collected data was analyzed using both descriptive and parametric inferential statistics of independent t-test for testing the difference between means. All computations were done via Excel Solver and SPSS (version 22). The results from the analysis showed among other findings that: foams manufacturing companies in Gombe State do not use an optimization model in product mix planning; foams manufacturing companies in Gombe State are not operating optimally although the optimum solution quantities and the existing solution quantities showed a correlation of 0.741 and a t-value of -0.751 signifying no significant difference in the mean values of operating at optimum solution level and operating at the existing solution level; We also found an 817% increase in the weekly revenue for company A given an optimum solution while for company B, it is a 922% increase in the weekly revenue.

Keywords: decision variables, product mix, optimum solution quantities, existing solution quantities, foam manufacturing companies, linear programming, sensitivity analysis, excel solver, SPSS.

GJSFR-I Classification: FOR Code: 091099

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Keywords: decision variables, product mix, optimum solution quantities, existing solution quantities, foam manufacturing companies, linear programming, sensitivity analysis, excel solver, SPSS.

I. Introduction

The alarming and continuous degenerating state of the Nigerian economy warrants that corporations use resources optimally in attaining their objectives. This is because an organization might have more than one decision variable to utilize in order to attain a particular objective. Decision variables are subject to some constraints (limited resources) necessitating their optimal rationing to attain the best result for the organization. When limited resources are optimized, wastages of resources are kept at minimum, the cost of production is minimized and the profit is maximized. Goh, et al (2014) observed that resources typically include machines, labor, money, time, and raw materials. According to Tatay (2013), one wide field of the quantitative tools that can be applied to support practical management decisions is operations research, which is also called management science or decision science that deals with optimization theory. Tatay (2013) also added that production management decisions can be successfully supported by the results and models of operations research and that, linear programming (LP) is such a holistic decision support tool that can be applied to support operational decision making relating to several functional fields of corporate operation. In addition, Agarana, et al (2014) opined that linear programming is a time-lasted-problem solving approach that enhances decision making of managers especially when certain restrictions or constraints exist which could affect the decision making process. Moreover, they stated that linear programming is a procedure for finding the maximum or minimum of a linear function where the augments are subject to linear constraints; and lastly that the Simplex method, which was first proposed by Dantzig in 1947, is one well known algorithm belonging to this class. Still on the importance of linear programming, Khan, et al (2011) noted that linear programming is a powerful tool for the optimal allocation of scarce resources with the objective of maximization of profit. In practical terms, Dahiya & Verma (2007) opined,

> The merits of linear programming are nowadays well established and linear programming is widely accepted as a useful tool in Operations Research and Management Science. A large number of companies are using this way of modeling to solve various kinds of practical problems. Applications include transportation problems, production planning, investment decision problems, blending problems, location and allocation problems, among many others. (p.1).

Still elaborating on the practical application of linear programming (LP), Wiley (2002) observed that: many real world problems lend themselves to LP modeling; many real world problems can be approximated by linear models; and that, LP model has been successfully applied in the following areas: Manufacturing, Marketing, Finance (investment), Advertising and Agriculture. The noble laureate Leonid Kantorovich (USSR) and Tjalling Koopmas (USA) as

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cited by Khan, et al (2011), were awarded for their work on the optimal allocation of resources using the technique of linear programming. Basically, there are two methods for attaining an optimal solution in linear programming, the graphical method and the Simplex method. Khan, et al (2011) stated that the Simplex method is regarded as the most important and credible method that was devised in the mid 20th century and at the moment, it is a benchmark optimizing tool saving thousands and millions of dollars in many organizations.

Dahiya & Verma (2007) stated that most of the packages available for solving linear programming do not only solve the LP problem but also provide the option to ask for information on the sensitivity of the solution to certain changes in the data and referred to this technique as sensitivity analysis or post optimality analysis. Considering the practical application of linear programming models, Tatay (2013) observed that sensitivity analysis can be as important as finding the optimal solution itself because based on sensitivity analysis, results effects of the changes of the environmental factors (prices, costs) on the optimal solution and the probable effects of managerial decisions (changes in the capacity, demand management) can be evaluated.

Foam manufacturing companies in Gombe State produce foams of different types and sizes for sale. From the review of related literature, optimization techniques have been used to appraise the state of operations of some industries for optimality both local and international but little if any in the foam producing companies in Gombe State. The essence of producing optimally in the fast becoming global competitive market cannot be over emphasized but clearly imagined. More so, the degenerating economic reality of the country warrants judicious use of scarce resources more than ever before. It is not understood if foam producing companies in Gombe State apply an optimization technique, a trial and error method or intuitive approach in product planning for profitability objective. In brief, are foams manufacturing companies in Gombe State operating optimally in product mix planning? In addition to the above question, this research will also provide answers to the following questions:

- Do foams manufacturing companies in Gombe State use an optimization model for product-mix planning? If so, which optimization model(s) do they use?
- Are foams manufacturing companies in Gombe State operating optimally?
- Which of the factor(s) of production is/are most limiting foams manufacturing companies in Gombe State from operating optimally?
- How do we mitigate these problems if any and situate foams manufacturing companies in Gombe State to operating optimally?

To attain the main objective of the research, the following hypothesis was tested:

HO_1: There is no significant difference between operating at optimum solution quantity X_i and existing practice quantity X_i

This study will be of benefit to a number of stakeholders: the management, employees, and suppliers of raw materials, customers, creditors, investors, banks, the federal government, and the community at large. Operating optimally ensures survival and sustainability for any company as well as for the various linkages (stakeholders) of the corporation. The study covered a time period of three years (2016 to 2018) of foams manufacturing companies in Gombe State. The remaining part of this research include, literature review, methodology, results, conclusion, recommendations and references

II. Literature Review

A number of people have defined Linear Programming in a number of ways and among them are: Soumendra (2005), Sankheerth, et al (2010) and Wiley (2002). Soumendra (2005) defined LP as, "A minimization problem where we are asked to minimize a given linear function subject to one or more linear inequality constraints. The linear function is also called the objective function."(p.1). Sankheerth, et al (2010) defined LP as, " A mathematical modeling technique useful for the allocation of "scarce or limited" resources such as labour, material, time, warehouse space, etc….., to several competing activities such as product, service, job, new equipments, projects, etc…on the basis of a given criteria of optimality."(p.3). Wiley (2002) defined LP as, "A model that seeks to maximize or minimize a linear function, subject to a set of linear constraints; a model consisting of the following components: a set of decision variables, an objective function and a set of constraints."(p. 2).

A linear programming problem with "n" decision variables and "m" constraints can be mathematically modeled as in (Taha, 1975; Zeleny, 1982; Winston, 1995; Higle and Wallence, 2003) in Khan, et al (2011, p.207) as follows:

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$$MAXIMIZE\ Z: C_1X_1 + C_2X_2 + ------ + C_nX_n$$

$$S.t$$

$$a_{11}X_1 + a_{12}X_2 + ---------- + a_{1n}X_n \leq b_1$$

$$a_{21}X_1 + a_{22}X_2 + ---------- + a_{2n}X_n \leq b_2$$

$$- \quad - \quad - \quad -$$

$$- \quad - \quad - \quad -$$

$$- \quad - \quad - \quad -$$

$$a_{n1}X_1 + a_{n2}X_2 + ---------- + a_{mn}X_n \leq b_m$$

$$X_1, X_2 \ ---------- \ X_n \geq 0$$

$$Max\, Z = C^t x$$

$$S.t.,$$

This can be written as,

$$a_x \leq b$$

$$X \geq 0$$

Oladokun and Johnson (2012) applied mathematical optimization techniques to the feed formulation problem of the typical Nigerian poultry farm using locally available feed ingredients and found that the weekly cost of producing layers feed is N47974 using the existing practice of the farm compared with the N43798 if feed formulation is based on the proposed mathematical model. And that this is a substantial savings of about 9%. Igwe, et al (2013) applied linear programming approach to combination of crops, Monogastric Farm Animal and Fish Enterprises in Ohafia Agricultural Zone, Abia State, Nigeria and prescribed 0.29 hectares for yam, 0.02 hectares for cassava and 0.13 hectares for cassava/maize/cocoyam for crop enterprises while 0.14 for 500 birds (70 birds) broiler II done August –December, 0.22 of 1000 fish (220 fish) of fish I done January – June and 0.41 of 500 birds (205) of Layer for the livestock enterprises in the study area to maximize gross margin. The results indicate that optimum plans resulted in an increase in gross margin over the existing plan by 72.90%. This implies that farm resources were not optimally allocated in the existing plan.

Khan, et al (2011) used linear programming and sensitivity analysis to determine the optimal production planning for Ici Pakistan and found the followings; that the company can generate a profit of R.s 3273786300, an amount R.s 30,300 greater than the presently operating profit. That the cost of goods sold, quantity sold of polyester, paints and chemicals are binding constraints and they are consumed fully whereas all the other constraints are non-binding and are available for the future production runs. That among the four different products manufactured at the company taken into consideration, the analysis predicted that the production of Soda Ash is contributing more than other products to the objective function. Also determined were the lower and upper limits of the variables in which the solution is optimal.

According to Agarana, et al (2014), an effective way of evaluating bank's credit policies for bad debt is through the linear programming approach. Moreover, Agarana, et al (2014) applied linear programming technique to find an optimal way of managing the loan portfolio of banks in order to maximize profit and found that in order to reduce the risk of bad debt incidence to the barest minimum, the banks should reduce the percentage of the unsecured loans since that will not significantly affect the achievement of their aims and objectives. Okoli et al (2012) applied linear programming technique in production planning and scheduling of five parts of two particular plastic products on three different machines and found the optimum profit of N4,898,182, the optimum production plan as follows; Ice cream body 203,636 pieces, Paint bucket body 120,000 pieces, Paint bucket handle 120,000 pieces, Paint bucket cover 120,000 pieces, the Ice cream cover 203,636 pieces and that all parts that make up the Paint bucket should be produced only during the night shifts while those of Ice cream container should be produced only during the day.

III. Research Methodology

The survey research and exploratory research design was found more appropriate and the primary source of data was used. The primary source of data collection was by interview and administration of questionnaire to management staff of the sampled companies. The population of the study is all the four local foam manufacturing companies in Gombe State and a sample size of two based on size and data availability was chosen. The collected data was analyzed using both descriptive and inferential parametric statistics. The descriptive statistics employed include: frequency, mean and standard deviation (See appendix D) while linear programming and sensitivity analysis were used to ascertain the optimal solution quantities, the optimal profits, minimum, maximum and range of optimality, minimum, maximum and range of feasibility, binding constraints, non-binding constraints, shadow price(s) and slack (excess capacities in the constraints) and definition and naming of variables for further analysis (See appendix B1 and B2). Sequentially, the optimal solution quantities were juxtaposed vis-à-vis results from the existing practice of the cases under study (See appendix C). This was followed by the test of hypotheses using the parametric inferential statistics of the independent T-test equation for testing the difference between means as in, Chambers and Crawshaw (1990) (See appendix, D). All the above statistical procedure was done via Excel Solver and SPSS (version 22).

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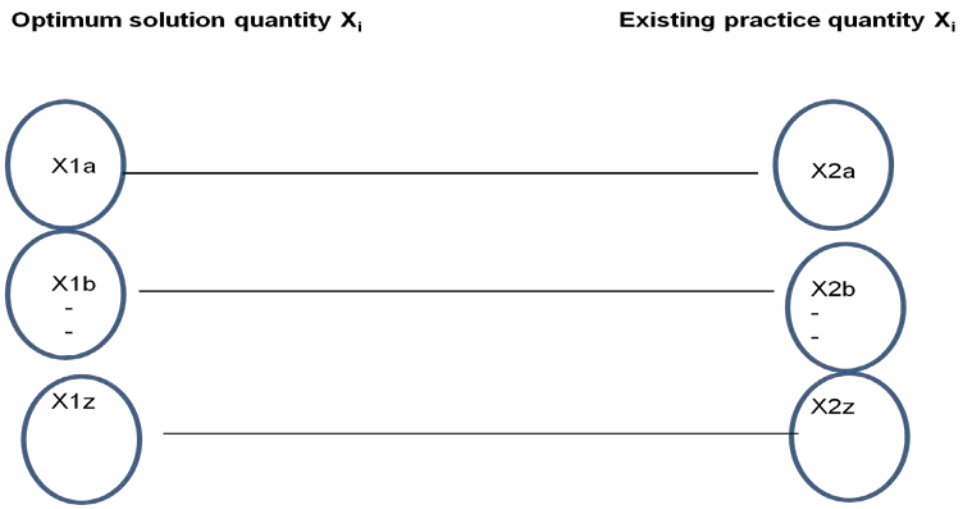

SOURCE: RESEARCHERS' CONCEPTUALIZATION

Fig. 1: Variables description

The Independent T-Test Equation for Testing the Difference between Means

The independent t-test for testing the difference between means (See Chambers and Crawshaw (1990:481), is stated here.

$$/ Z / = \frac{(x_1 - x_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\delta_1^2}{n_1} + \frac{\delta_2^2}{n_2}}}$$

Where / Z / = magnitude of mean difference between :

(1) Optimum solution quantity X_i *and existing practice quantity* X_i

X_1 = *mean or average of* :

(2) *Optimum solution quantity* X_i

X_2 = *mean or average of* :

(3) *Existing practice quantity* X_i

$\mu_1 = \mu_2$ = *mean of population* (*number of foams producing companies*)

∂_1^2 = *Variance of* :

(1) *Optimum solution quantity* X_i

∂_2^2 = *Variance of* :

(2) *Existing practice quantity* X_i

n_1 = *numerical number of* ;

(1) *Optimum solution quantity* X_i

n_2 = *numerical practice quantity*

(2) *Existing practice quantity* X_i

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Decision rule:

The null hypothesis is accepted if the magnitude / Z / or t-value falls within / **Z** / or t > 1.96 that is -1.96 < Z or t < +1.96 at 5% level of significance otherwise the alternate hypothesis is accepted. Alternatively, the null hypothesis is rejected if p-value is less than 5%. The two tail test was used.

IV. Results

The results from the analysis show among other findings that: foams manufacturing companies in Gombe State do not use an optimization model in product mix planning; foams manufacturing companies in Gombe State are not operating optimally although the optimum solution quantities and the existing solution quantities showed a correlation of 0.741 and a t-value of -0.751 signifying the acceptance of the null hypothesis that there is no significant difference in the mean values of operating at optimum solution level and operating at the existing solution level. Making further analysis vis-à-vis percentage change in revenue per week for both companies under peak and low periods is contained in table 1.

Table 1: Analysis of Revenue per Week

	Revenue per week during peak and low periods for both the optimal solution and the existing solution quantities					
	Company A			Company B		
	Optimum solution revenue(N)	Existing solution revenue(N)	% increase/ (decrease)	Optimum solution revenue(N)	Existing solution revenue(N)	% increase/ (decrease)
Peak period	3106153	338461	817%	8127643	794871	922%
Low peak	1553076	169230	817%	4063821	397435	922%

Source: Researcher's computation (2019)

If company A were to shift to adopt an optimization technique in product mix planning, this will results to a 817% increase in the weekly revenue while for company B, it will be 922% increase in weekly revenue.

Another finding of this work is that all the demand constraints are binding on production. The demand constraint could be mitigated by resorting to surveys to find out what is appealing and not appealing in the optimal product mix of the company.

V. Conclusion

The findings of the study are limited by the appropriateness of the statistical techniques, models and software packages employed for the analysis of data. Moreover, the findings of the study are limited by the validity of information as collected via interview, and by questionnaire. Finally, the researcher emphasize that those who filled the questionnaire were reluctant to disclose some vital information more importantly, sales values and profits. Research of this nature with an increased sample size and or covering more years should be conducted on foams manufacturing companies in Gombe state. Moreover, there are other Small and Medium Scale enterprises that are still virgin domains for a research of this nature to be conducted in Gombe state and other parts of the country.

VI. Recommendations of the Study

- Foams manufacturing companies in Gombe State should integrate optimization model in product mix planning in order to operate optimally
- Foams manufacturing companies in Gombe State should always be willing to and should disclose valid information to students and researchers
- Efforts via advertisement should be made by foams manufacturing companies in Gombe State in order to accelerate demand

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Appendix A: A copy of the questionnaire is available on demand from: wadphonse26@yahoo.co.uk or +2348036047101

Appendix B1: Optimum Solution Quantity Results Ans Sensitivity Report for Company A

Microsoft Excel 12.0 Answer Report

Worksheet: [Working now on sensitivity analysis.xlsx]Sheet1

Report Created: 2/6/2019 12:52:53 PM

Target Cell (Max)

Cell	Name	Original Value	Final Value
$G$10	Revenue	0	121140000

Adjustable Cells

Cell	Name	Original Value	Final Value
$B$10	S	0	749
$C$10	D	0	0
$D$10	V	0	140
$E$10	A	0	0
$F$10	SH	0	650

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$B$13	Labour	31165.7	$B$13<=$D$13	Not Binding	34.3
$B$14	Machine	1392.51	$B$14<=$D$14	Not Binding	11.49
$B$15	Diesel	5940.5	$B$15<=$D$15	Not Binding	143.5
$B$16	Calcium	48047.5	$B$16<=$D$16	Not Binding	52.5
$B$17	Polyol	147407	$B$17<=$D$17	Not Binding	13
$B$18	Silicon	2314	$B$18<=$D$18	Not Binding	26
$B$19	Stanous	2867.8	$B$19<=$D$19	Not Binding	51.2
$B$20	Fabrics	155945.4	$B$20<=$D$20	Not Binding	54.6
$B$21	TDI	146210.5	$B$21<=$D$21	Not Binding	39.5
$B$22	MC	30960.8	$B$22<=$D$22	Not Binding	44.2

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$B$23	Amine	22.548	$B$23<=$D$23	Not Binding	7.452
$B$24	Water	11700	$B$24<=$D$24	Binding	0
$B$10	S	749	$B$10<=749	Binding	0
$C$10	D	0	$C$10<=527	Not Binding	527
$D$10	V	140	$D$10<=140	Binding	0
$E$10	A	0	$E$10<=222	Not Binding	222
$F$10	SH	650	$F$10>=0	Not Binding	650
$B$10	S	749	$B$10>=0	Not Binding	749
$C$10	D	0	$C$10>=0	Binding	0
$D$10	V	140	$D$10>=0	Not Binding	140
$E$10	A	0	$E$10>=0	Binding	0

Microsoft Excel 12.0 Sensitivity Report

Worksheet: [Working now on sensitivity analysis.xlsx]Sheet1

Report Created: 2/6/2019 12:52:53 PM

Adjustable Cells

Cell	Name	Final Value	Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease
$B$10	S	749	17264.95726	60000	1E+30	17264.95726
$C$10	D	0	-14829.05983	45000	14829.05983	1E+30
$D$10	V	140	58632.47863	80000	1E+30	58632.47863
$E$10	A	0	-24102.5641	40000	24102.5641	1E+30
$F$10	SH	650	0	100000	40400	24785.71429

Constraints

Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease
$B$13	Labour	31165.7	0	31200	1E+30	34.3
$B$14	Machine	1392.51	0	1404	1E+30	11.49
$B$15	Diesel	5940.5	0	6084	1E+30	143.5
$B$16	Calcium	48047.5	0	48100	1E+30	52.5
$B$17	Polyol	147407	0	147420	1E+30	13
$B$18	Silicon	2314	0	2340	1E+30	26
$B$19	Stanous	2867.8	0	2919	1E+30	51.2
$B$20	Fabrics	155945.4	0	156000	1E+30	54.6
$B$21	TDI	146210.5	0	146250	1E+30	39.5
$B$22	MC	30960.8	0	31005	1E+30	44.2
$B$23	Amine	22.548	0	30	1E+30	7.452
$B$24	Water	11700	8547.008547	11700	1.031886024	7605

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Appendix B2: Optimum Solution Quantity Results Ans Sensitivity Report for Company B

Microsoft Excel 12.0 Answer Report

Worksheet: [Working now on sensitivity analysis.xlsx]Sheet2

Report Created: 2/6/2019 12:51:15 PM

Target Cell (Max)

Cell	Name	Original Value	Final Value
$G$10	Revenue	0	316978090.9

Adjustable Cells

Cell	Name	Original Value	Final Value
$B$10	U	0	624
$C$10	W	0	1378
$D$10	H	0	364
$E$10	N	0	575
$F$10	SH	0	719.1636364

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$B$13	Labour	60302.22182	$B$13<=$D$13	Not Binding	21129.77818
$B$14	Machine	643.8509091	$B$14<=$D$14	Not Binding	32.14909091
$B$15	Diesel	780.0290909	$B$15<=$D$15	Not Binding	25.97090909
$B$16	Calcium	24314.55455	$B$16<=$D$16	Not Binding	385.4454545
$B$17	Polyol	79554.67273	$B$17<=$D$17	Not Binding	1045.327273
$B$18	Silicon	1300	$B$18<=$D$18	Binding	0
$B$19	Stanous	469.7669273	$B$19<=$D$19	Not Binding	24.23307273
$B$20	Fabrics	48686.60909	$B$20<=$D$20	Not Binding	713.3909091
$B$21	TDI	38415.55455	$B$21<=$D$21	Not Binding	584.4454545
$B$22	MC	10169.65455	$B$22<=$D$22	Not Binding	360.3454545
$B$23	Water	3841.555455	$B$23<=$D$23	Not Binding	58.44454545
$B$10	U	624	$B$10<=624	Binding	0
$C$10	W	1378	$C$10<=1378	Binding	0
$D$10	H	364	$D$10<=364	Binding	0
$E$10	N	575	$E$10<=575	Binding	0
$F$10	SH	719.1636364	$F$10>=0	Not Binding	719.1636364
$B$10	U	624	$B$10>=0	Not Binding	624
$C$10	W	1378	$C$10>=0	Not Binding	1378
$D$10	H	364	$D$10>=0	Not Binding	364
$E$10	N	575	$E$10>=0	Not Binding	575

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Microsoft Excel 12.0 Sensitivity Report

Worksheet: [Working now on sensitivity analysis.xlsx]Sheet2

Report Created: 2/6/2019 12:51:15 PM

Adjustable Cells

Cell	Name	Final Value	Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease
$B$10	U	624	50363.63636	110000	1E+30	50363.63636
$C$10	W	1378	53636.36364	90000	1E+30	53636.36364
$D$10	H	364	17000	65000	1E+30	17000
$E$10	N	575	28454.54545	75000	1E+30	28454.54545
$F$10	SH	719.1636364	0	80000	28333.33333	80000

Constraints

Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease
$B$13	Labour	60302.22182	0	81432	1E+30	21129.77818
$B$14	Machine	643.8509091	0	676	1E+30	32.14909091
$B$15	Diesel	780.0290909	0	806	1E+30	25.97090909
$B$16	Calcium	24314.55455	0	24700	1E+30	385.4454545
$B$17	Polyol	79554.67273	0	80600	1E+30	1045.327273
$B$18	Silicon	1300	145454.5455	1300	18.54612903	395.54
$B$19	Stanous	469.7669273	0	494	1E+30	24.23307273
$B$20	Fabrics	48686.60909	0	49400	1E+30	713.3909091
$B$21	TDI	38415.55455	0	39000	1E+30	584.4454545
$B$22	MC	10169.65455	0	10530	1E+30	360.3454545
$B$23	Water	3841.555455	0	3900	1E+30	58.44454545

Appendix C: Optimum and Existing Solution Quantities

		Optimum Solution Quantity	Existing Solution Quantity
1	S	749	936
2	D	0	585
3	V	140	234
4	A	0	234
5	SH	650	78
6	U	624	780
7	W	1378	1760
8	H	364	390
9	N	575	598
10	SH	719.1	390

Appendix D: Independdent T-Test for Testing the Difference between Means

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Optimum Solution Quantity	519.9100	10	417.46892	132.01527
	Existing Solution Quantity	598.5000	10	485.30615	153.46728

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Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Optimum Solution Quantity & Existing Solution Quantity	10	.741	.014

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Optimum Solution Quantity - Existing Solution Quantity	-78.59000	330.98807	104.66762	-315.36460	158.18460	-.751	9	.472

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On the Issue of Improving Professional Training for Masters of Physical Education

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Mininsky University

Abstract- The relevance of the presented topic is due to the conceptual transformations of the training of masters of physical education. Currently, universities are becoming increasingly independent in developing master's degree programs: in determining the type of program (research or practice-oriented), in choosing the type of professional activity for which students are preparing, in selecting and building content at the level of modules, disciplines, and educational material. In this regard, important issues of goals, content, and specificity of training graduate of pedagogical University, in particular, in the preparation of graduates who have no professional educational background. The study revealed the state of implementation of the master's program in the direction of training 44.04.01 Pedagogical education, the profile "Educational technologies in the field of physical culture" in the NSPU named after K. Minin based on the analysis of academic performance and involvement in the educational process of undergraduates who have and do not have a basic education. A model of professional training of a specialist in the field of physical culture with non-core education based on the use of electronic services has also been developed.

Keywords: master's degree, basic specialized education, physical education profile, master's professional training model, electronic platform moodle.

GJSFR-I Classification: FOR Code: 130299

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On the Issue of Improving Professional Training for Masters of Physical Education

К ВОПРОСУ СОВЕРШЕНСТВОВАНИЯ ПРОФЕССИОНАЛЬНОЙ ПОДГОТОВКИ В МАГИСТРОВ ФИЗКУЛЬТУРНОГО ПРОФИЛЯ

Stafeeva Anastasiya Vladimirovna [α] & Ivanova Svetlana Sergeevna [σ]

Abstract- The relevance of the presented topic is due to the conceptual transformations of the training of masters of physical education. Currently, universities are becoming increasingly independent in developing master's degree programs: in determining the type of program (research or practice-oriented), in choosing the type of professional activity for which students are preparing, in selecting and building content at the level of modules, disciplines, and educational material. In this regard, important issues of goals, content, and specificity of training graduate of pedagogical University, in particular, in the preparation of graduates who have no professional educational background. The study revealed the state of implementation of the master's program in the direction of training 44.04.01 Pedagogical education, the profile "Educational technologies in the field of physical culture" in the NSPU named after K. Minin based on the analysis of academic performance and involvement in the educational process of undergraduates who have and do not have a basic education. A model of professional training of a specialist in the field of physical culture with non-core education based on the use of electronic services has also been developed.

Keywords: master's degree, basic specialized education, physical education profile, master's professional training model, electronic platform moodle.

Аннотация- Актуальность представленной темы обусловлена концептуальными преобразованиях подготовки магистров физкультурного профиля. В настоящее время вузы приобретают все большую самостоятельность в разработке программ подготовки магистров: в определении типа программы (исследовательская или практико-ориентированная), в выборе вида профессиональной деятельности, к которой готовятся студенты, в отборе и построении содержания на уровне модулей, дисциплин, учебного материала. В этой связи актуально решение вопросов постановки целей, содержания и специфики профессиональной подготовки в магистратуре педагогического вуза, в частности, в подготовке магистрантов, не имеющих профильного базового образования. В исследовании выявлено состоянии реализации программы магистратуры по направлению подготовки 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры» в НГПУ им. К. Минина на основе анализа успеваемости и вовлеченности в учебный процесс магистрантов, имеющих, и не имеющих базовое образование. А также разработана модель профессиональной подготовки специалиста в сфере физической культуры с непрофильным образованием на основе использования электронных сервисов.

Ключевые слова: магистратура, базовое профильное образование, физкультурный профиль подготовки, модель профессиональной подготовки магистров, электронная платформа moodl.

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I. Introduction

Современное общество находится на этапе перемен. Россия идет путем инновационного развития, и образование, как система формирования интеллектуального капитала нации и одна из главных сфер производства инноваций, является основным ресурсом движения в данном направлении. Воспроизводство прежней системы образования, созданной для индустриальной экономики, в условиях информационного общества и глобального инновационного уклада стало не эффективным. Поэтому в нашей стране сформировался устойчивый и рациональный запрос на изменения в области образования, который на государственном уровне нашел отражение в ряде документов: Концепции долгосрочного развития России на период до 2025 года (Макарова, 2011).

При этом особое внимание отводится подготовке педагогов, поскольку кадровый ресурс является основным в реализации и поддержании устойчивости образовательных изменений (Альтергот & Дроботенко & Чекалева, 2002). Современному педагогу предназначено играть роль внутреннего трансформатора системы образования, настроенного на реализацию задач по переходу к обществу инновационного уклада (Гладкая, 2002).

В российской системе высшего образования магистратура педагогического направления имеет потенциал подготовки педагогов-исследователей для сопровождения образовательных изменений (Vorobyov, 2019). Однако четкие ориентиры для создания качественных магистерских программ все еще

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отсутствуют: постоянно меняется нормативный контекст функционирования магистратуры, работодатели еще не способны предложить дифференцированные требования к подготовке бакалавров и магистров, и процесс разработки профессиональных стандартов еще не завершен (Vorobyov&Burkhanova, 2018, Кочнева, 2019). В такой ситуации актуально рассмотрение вопросов целей, содержания и специфики профессиональной подготовки в магистратуре педагогического вуза (Клименко, 2014).

Вместе с тем, содержание профессиональной подготовки не задано в традиционном его понимании, поскольку стандарты определяют лишь результаты освоения магистерских программ, выраженные на языке компетенций. Вузы приобретают все большую самостоятельность в разработке программ подготовки магистров: в определении типа программы (исследовательская или практикоориентированная), в выборе вида профессиональной деятельности, к которой готовятся студенты, в отборе и построении содержания на уровне модулей, дисциплин, учебного материала (Роботова, 2013).

Еще одной проблемой подготовки квалифицированного специалиста является то, что набор на подавляющее большинство магистерских программ осуществляется при наличии диплома о высшем образовании любого профиля подготовки (Grigorieva, 2020). С одной стороны, данная возможность позволяет человеку менять свой профессиональный путь и самосовершенствоваться в различных направлениях, с другой – затрудняет освоение программы магистратуры, в связи с отсутствием базовых знаний и умений в определенной отрасли (Bystritskaya, 2019).

В этой связи нами сформулирована проблема исследования, заключающаяся в отсутствии в основных профессиональных образовательных программах (ОПОП) программ магистратуры образовательных модулей, направленных на создание базовой профессиональной подготовки магистрантов, не имеющих профильного образования.

В качестве рабочей гипотезы нами предполагалось, что обеспечение качественной профессиональной подготовки квалифицированных конкурентно-способных специалистов по физической культуре и спорту, возможно, при включении в ОПОП программы магистратуры по направлению подготовки 44.04.01 Педагогическое образование, профиля «Образовательные технологии в сфере физической культуры» модуля, направленного на формирование у магистрантов, не имеющих базового профильного образования, необходимых, для получения профессии специалиста по физической культуре и спорту знаний и умений в области теории и методики физической культура и спорта и физиологии спортивной деятельности.

Целью исследования явилось обоснование разработки модели профессиональной подготовки специалиста в сфере физической культуры с непрофильным образованием.

Для решения поставленных задач нами было проведено анкетирование магистрантов 1 курса. Всего в опросе приняли участие 25 магистрантов 1-2 курсов факультета физической культуры и спорта НГПУ им. К.Минина. Анкетирование было направлено на получение информации об актуальном состоянии реализации программы магистратуры по направлению подготовки 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры» в НГПУ им. К. Минина на основе анализа успеваемости и вовлеченности в учебный процесс магистрантов, имеющих, и не имеющих базовое образование. В рамках исследования решались следующие задачи:

- определение трудностей в обучении магистрантов, не имеющих базового профильного образование по отдельным модулям и программе в целом;
- выявление существующих системных проблем реализации базовых и вариативных модулей, связанных с содержанием образовательных программ, организационно-педагогическими условиями обучения и условиями и организацией образовательного процесса;
- определение самооценки своего уровня обученности у магистрантов.

Анкетирование было анонимным, что очень важно в получении объективной информации.

Было выделено несколько критериев, позволяющих рассмотреть вовлеченность обучающихся в различных аспектах:

- трудности в освоении образовательных модулей;
- фактическая деятельность на занятиях;
- мотивация обучающихся к занятиям;
- удовлетворенность содержанием существующих программ по дисциплинам образовательных модулей;
- удовлетворенность организационно-педагогическими условиями обучения (методами, средствами и формой обучения);
- удовлетворенность условиями и организацией образовательного процесса (условиями, в которых проходят занятия, и их режиму);
- объективные и субъективные результаты обучения;

При оценке результатов применялись аналитический и статистический методы.

II. Results

Удовлетворенность магистрантами объемом теоретического и практического материала представленном в модуле различна в зависимости от особенностей исходного уровня подготовленности и курса. Так, объем учебного материала оптимален для 75,5% студентов 1 курса, 67,9% - 2 курса. Остальные респонденты указали, что им хотелось бы, чтобы

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материал был более практическим (при этом примечательно, что первокурсники чаще жалуются на недостаток теории, а обучающиеся 2-го курса - на практики).

Выполнение практических заданий самостоятельно не вызывает проблем у 31,7% опрошенных (в основном, студенты 2 курса). Остальные магистарнты сталкиваются с трудностями при выполнении тех или иных заданий; доли практически не справляющихся с заданиями среди первых курсов более чем в два раза больше, чем среди второго.

Удовлетворенность от занятий не испытывают 9,8% занимающихся с 2 курса, 13,7% студентов 1 курса. В то же время трудности, мешающее дальнейшему освоению учебного материала в модулях, проявляется у соответственно у 17,1% и 17,2% магистрантов. Примечательно, что трудности в освоении учебного материала самостоятельно в той или иной степени испытывают даже магистранты, удовлетворенные объемом учебного материала на занятии и не испытывающие серьезных трудностей при выполнении отдельных заданий.

Мотивация обучающихся и эмоциональная составляющая занятий. Наиболее распространенной эмоцией, возникающей у магистрантов на самостоятельных занятиях является удовлетворение (42,4%), чуть менее распространены интерес (35,4%) и равнодушие (27,5%). Нежелание выполнять задания испытывают 26% респондентов. В дополнение к списку магистранты указали, что испытывают большое количество других отрицательных эмоций разной интенсивности (уныние, раздражение, отвращение и др.). Неоднократно упоминались апатия, а также недоумение от непонимания смысла осуществляемой деятельности. Некоторые респонденты указали, что не испытывают никаких эмоций. Из положительных эмоций респонденты дополнительно привели воодушевление и веру в себя. Причем положительные эмоции в основном испытывают студенты 1 курса, а с повышением курса респондентов доля испытываемых отрицательных эмоций растет.

Наиболее распространенным мотивом к изучению курса является получение зачета или оценки (43%), далее с минимальным отрывом следует восполнение необходимых для профессиональной деятельности знаний (67%). В итоге, получение новых знаний и расширение кругозора входит в наименее распространенные мотивы из предложенного списка. В поле для свободных ответов были получены варианты, отражающие широкий спектр мотивов - как позитивных, так и негативных.

Удовлетворенность содержанием существующей программы дисциплины (модуля) «Теоретико-методические и медико-биологические основы физической культуры и спорта», организационно-педагогическими условиями обучения и организацией образовательного процесса. 71,3% респондентов отметили, что их освоению модуля самостоятельно мешают те или иные факторы. Чаще всего магистранты указывали на не хватку времени (35,2%) и утомление в конце учебного дня после работы (31,7%). Более 20% магистрантов отметили такие факторы, как лень, неумение работать с электронными ресурсами, отсутствие мобильных средств обучения (ноутбука и т.п). 17,8% также выделили проблемы со здоровьем.

Чуть больше трети опрашиваемых (37,3%) не отметили никаких недостатков в содержании и организации обучения в модуле. Среди наиболее распространенных недостатков - невозможность выбора видов деятельности (31,9%), недостаток литературы на электронных носителях, предложенных в курсе (31,3%), слабая представленность в программе современных спортивных направлений (30,2%), недостаток интересных практико-ориентированных заданий.

В рамках теоретической подготовки магистранты хотели бы поподробнее ознакомиться с навыками самодиагностики здоровья и медико-биологическими процессами, происходящими в организме во время занятий. В качестве значимого недостатка организации освоения модуля магистранты отметили отсутствие индивидуального подхода (оценка исходного уровня знаний и умений и на их основе подбор содержания модуля).

Объективные и субъективные результаты обучения. Субъективная оценка студентами результатов, достигнутых на занятиях, показала, что компетенции в области теории и методики физической культуры, предусмотренные требованиями ФГОС высшего образования, сформированы не у всех магистрантов.

Знаний по каждому вопросу, рассматриваемому в рамках учебного курса, совсем не имеют не менее 4,5% магистрантов. Хуже всего усвоены развитие знаний и умений, необходимых в будущей профессиональной деятельности (в той или иной степени знания сформированы только у 14% респондентов) и умение составлять комплексы физических упражнений и подбирать индивидуальную нагрузку для развития физических качеств (64,6%). Овладение навыками контроля за физическим развитием и состоянием организма тоже усвоен в достаточной степени (около 87%). Больше всего было выявлена сформированность знаний о технике выполнения физических упражнений (91,5%). По нашему мнению, это связано с тем, что магистранты имеют опыт практической профессиональной деятельности.

Систематизация результатов анкетирования относительно критериев заинтересованности и целесообразности обучающихся в занятия по модулю «Теоретико-методические и медико-биологические основы физической культуры и спорта» выявляет

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следующие поведенческие и психологические характеристики обучающихся, сопровождающие их участие в занятиях, и указывает на существование ряда проблем в области реализации данного модуля в рамках реализации программы магистратуры по направлению подготовки 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры»:

1. Теоретическая часть курса, направленная на формирование у обучающихся знаний в области физической культуры и спорта, представлена достаточно. Виды деятельности, указывающие на использование магистрантами в теоретической работе активных методов обучения - подготовка проектов, выполнение творческих заданий, кейсов, контекстных задач и др. - также широко представлены.
2. Прикладываемые на занятиях усилия и трудности в освоении материала.

Так как в модуле преобладает теоретическая направленность материала, на первый план выходят трудности, прикладываемые обучающимися для выполнения практико-ориентированных заданий.

Среди студентов 1 курса больше всего обучающихся, отмечающих нехватку силы воли и времени. На втором курсе - с нехваткой практических заданий. Таким образом, трудности , возникающие при освоении модуля оптимальны для большей части магистрантов.

3. Мотивация обучающихся и эмоциональная составляющая занятий.

Наиболее распространенные мотивы к освоению модуля - получение зачета или оценки и приобретение новых знаний. Причем с курсом акценты смещаются: на 1 курсе первое место выходит мотив к необходимости получения оценки или зачета и угроза негативных последствий со стороны преподавателей и администрации. Что говорит о низком уровне значимости самостоятельного освоения модуля среди жизненных приоритетов магистрантов и необходимости особым образом формировать у них интерес к этим занятиям как возможности развивать личностно и профессионально значимые умения и навыки.

В целом, приведенные результаты показывают, что многие магистранты придают достаточное значение модулю, устойчивая внутренняя потребность в занятиях в рамках основной образовательной программы у них присутствует.

4. Удовлетворенность содержанием существующего образовательного модуля «Теоретико-методические и медико-биологические основы физической культуры и спорта», организационно-педагогическими условиями обучения и организацией образовательного процесса. Все магистранты отметили необходимость включения выравнивающего модуля в ОПОП по направлению подготовки. Более того, обучающиеся выразили пожелание включить занятия с актуальными практиками. Это необходимо учитывать при корректировке основной образовательной программы.

Респонденты выражают пожелание по проведению занятий в имеющихся на факультете лабораториях, а также возможность выбирать вариативны. Часть модуля в зависимости от предпочтений, интересов и вида профессиональной деятельности, что приведет их более высокой вовлеченности в занятия.

5. Объективные и субъективные результаты обучения.

Данные субъективной оценки приобретенных знаний, умений и навыков показали, что в каждой категории есть небольшая доля (8%) обучающихся, не достигших в ходе обучения результатов, предусмотренных требованиями ФГОС. На всех курсах у магистрантов наблюдаются значительные пробелы в знаниях, организации самообразования. Лучше всего изучены обучающимися техника выполнения физических упражнений, технология развития физических качеств, а также техника безопасности при занятиях физической культурой и спортом.

Хуже всего, у обучающихся выявлены умения и навыки, связанные с планированием занятий физической культурой в образовательных учреждениях различного типа.

По итогам анкетирования было сделано заключение, что доля магистрантов, которые не приобрели при освоении курса тех или иных знаний, умений и навыков в области физической культуры, является индикатором того, что сложившиеся практики реализации ОПОП по направлению подготовки 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры» не в полной мере обеспечивают выполнения требований ФГОС. Кроме того, наблюдаемая несогласованность объективных оценок обучающихся по ОПОП и субъективных оценок приобретенных при изучении других дисциплин учебного плана ставит под сомнение эффективность используемых оценочных средств.

Моделирование содержания основной профессиональной образовательной программы (далее – ОПОП) подготовки магистранта, реализуемой Университетом по направлению подготовки 44.04.01 Педагогическое образование, профиль подготовки: Образовательные технологии в сфере физической культуры, представляет собой систему документов, разработанную и утвержденную Университетом на основе ФГОС ВО по направлению подготовки 44.04.01 Педагогическое образование с учетом профессионального стандарта, сопряженного с профессиональной деятельностью выпускника и разрабатывалось на основе Федеральный государственный образовательный стандарт высшего образования - магистратура (далее – ФГОС ВО) по

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направлению подготовки 44.04.01 Педагогическое образование, утвержденный приказом Минобрнауки России от «22» февраля 2018 г. № 126.

Цель создания модели ОПОП – обеспечение качественной профессиональной подготовки квалифицированных конкурентно-способных специалистов, готовых к образовательной, научно-методической и организационно-управленческой деятельности, психолого-педагогическому сопровождению общего, специального и дополнительного образования по физической культуре и спорту.

Для достижения данной цели в рамках учебного плана был разработан выравнивающий образовательный модуль в объеме 2 зачетных единиц (ЗЕ) для магистрантов, не имеющих базового образования.

Цель данного модуля - формирование у магистрантов, не имеющих базового профильного образования необходимых для получения профессии специалиста по физической культуре и спорту знаний и умений в области теории и методики физической культура и спорта и физиологии спортивной деятельности. Трудоемкость модуля составила 72 часа, все часы планируются на самостоятельную работу.

Содержание модуля «Теоретико-методические и медико-биологические основы физической культуры и спорта» разработано на электронной платформе moodl на электронном курсе «Программа магистратуры 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры и спорта».

Прохождение модуля являлось для магистрантов, не имеющих базовое образование обязательным, планировалось в первом семестре. Результаты прохождения модуля магистрантов входили в рейтинг-план дисциплины «Физкультурно-оздоровительные технологии в физическом воспитании детей и взрослых», планируемом также в первом семестре.

Трудоемкость модуля составила 72 часа, все часы планируются на самостоятельную работу. Содержание модуля разработано на электронной платформе moodl в виде модуля в электронном курсе «Программа магистратуры 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры и спорта». Данный модуль мы назвали «Теоретико-методические и медико-биологические основы физической культуры и спорта» https://ya.mininuniver.ru/sdo. Курс для магистрантов содержит разделы для оказания теоретической и методической помощи в организации процесса обучения. В содержание курса 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры и спорта» вошли такие разделы как: Раздел.1 Нормативно-методическое обеспечение реализации ОПОП 44.04.01. Педагогическое образование, профиль "Образовательные технологии в сфере физической культуры", в данном разделе представлены нормативные документы, обеспечивающие сопровождение учебного процесса в рамках программы магистратуры.

Раздел 2 курса содержал календарный график образовательного процесса, а также программы всех дисциплин и модулей, а также рейтинг-планы также по всем дисциплинам учебного плана.

В связи с тем, что производственная практика занимает определяющее место в подготовке магистрантов, в данном разделе опубликованы программы практик, дневники магистрантов, а также даются подробные методические рекомендации. Также в содержание курса вошли разделы «Научно-исследовательская работа» и «Итоговая государственная аттестация». В данных разделах представлены рекомендации по проведению научно-исследовательской работы, информация о проходящих конференциях и грантах, и другая информация научного характера.

В разделе «Итоговая государственная аттестация» представлены этапы подготовки магистерской диссертации, требования к оформлению научно-исследовательской работы, а также методические материалы об организации научно-исследовательской деятельности в помощь магистранту.

Разработанный нами Модуль «Теоретико-методические и медико-биологические основы физической культуры и спорта» содержит информационный раздел, в котором представлены цель, задачи и образовательные результаты модуля, инструкция работы с курсом, практические рекомендации по выполнению практических заданий. Первый раздел «Теория и методика физической культуры в системе профессиональной подготовки» содержал материал об основных понятиях физической культуры и спорта, средствах, методах, принципах физического воспитания, а также системе ФК и спорта в России. Данный раздел содержал как лекционный материал, так и ряд практических и тренировочных заданий для закрепления теоретических знаний.

Раздел 2 в курсе посвящен теоретико-методическим основам развития физических качеств. Данный раздел состоит из нескольких тем, освещающих вопросы развития силовых, скоростных, координационных способностей, выносливости и гибкости. В каждой теме разработан лекционный материал и контекстные задачи, для формирования умений планировать нагрузки на развитие различных физических качеств в зависимости от уровня подготовленности занимающихся и в возрастном аспекте. Раздел 3 и 4 посвящены формам построения занятий в физическом воспитании в образовательных учреждениях. Данные разделы очень важны по содержанию, так как в них формируются знания по

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современным требованиям к планированию и реализации учебного процесса в общеобразовательной школе и в учреждениях дополнительного образования. Разделы представлены лекционным материалом и практико-ориентированными заданиями, целью которых было формирование навыков планирования учебного материала, подбор адекватных возрасту и подготовленности педагогических технологий обучения и развития.

Раздел 5 был посвящен медико-биологическому обеспечению образовательного процесса.

Раздел был представлен лекционным материалом и практическими заданиями по вопросам физиологическим основам физической культуры и спорта, а также обеспечения контроля за функциональным состоянием занимающихся и методах контроля. Уровень сформированности образовательных результатов магистрантов после освоения выравнивающего модуля состоял из тестирования знаний по всем разделам модуля, а также итоговым кейс-заданием, темы которых предложены в разделе «Промежуточная аттестация».

Прохождение модуля являлось для магистрантов, не имеющих базовое образование обязательным, планировалось в первом семестре. Результаты прохождения модуля магистрантов входили в рейтинг-план дисциплины «Физкультурно-оздоровительные технологии в физическом воспитании детей и взрослых», планируемом также в первом семестре.

Таким образом, по нашему мнению, разработанный модуль «Теоретико-методические и медико-биологические основы физической культуры и спорта» в электронном курсе «Программа магистратуры 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры и спорта» будет способствовать формированию необходимых для получения профессии специалиста по физической культуре и спорту знаний и умений в области теории и методики физической культура и спорта и физиологии спортивной деятельности и обеспечит необходимый фундамент знаний для освоения программы магистратуры.

III. Conclusion

В современных условиях изменений в обществе, науке, высшем образовании категория профессиональной подготовки переживает существенное развитие. Профессиональная подготовка в современном вузе ориентирована на будущее, потенциально изменчивое содержание профессиональной деятельности. Она характеризуется открытостью, адресностью, гибкостью в отражении требований государства, общества, личности; практико ориентированностью и ориентацией на развитие творческих способностей и научно-исследовательского потенциала выпускников.

Профессиональная подготовка приобретает черты дискретности и принципиальной незавершенности: становится необходимо постоянное обновление компетенций путем освоения модульных программ на востребованном квалификационном уровне.

Программы подготовки магистров сегодня - это «быстрый» способ отражения требований рынка труда, профессионализации выпускников бакалавриата, удовлетворения образовательных потребностей студентов, желающих углубить знания в определенной области или развить новые компетенции, обучаясь на программах, отличных от профиля их базовой подготовки. В магистратуре педагогического вуза исследователи видят потенциал сопровождения развития образования через проведение коллективных исследований и подготовку выпускников - субъектов изменений, способных видеть проблему практики и решать ее на основе исследовательской компетентности.

Новая цель профессиональной подготовки в магистратуре педагогического вуза требует нового понимания профессиональной подготовки магистра образования как: становления субъектного опыта исследовательского видения целостной профессиональной деятельности и ее выполнения в позиции субъекта изменений. Исследовательская компетентность, в таком случае, представляет собой основной результат профессиональной подготовки магистра образования.

Анализ квалификационных требований показал, что специфика требований к результату профессиональной подготовки магистра образования состоит в усложнении аналитико-диагностического, преобразовательного и организационного компонентов компетенций. Иными словами, магистра образования отличает способность к системному, целостному видению проблем области профессиональной деятельности, к самостоятельности, вариативности и оригинальности в их решении, к организации соответствующей самостоятельной и коллективной работы. Аналитико-диагностический, преобразовательный и организационный компоненты усложнения требований выступают как содержательные компоненты исследовательской компетентности магистра образования, а необходимость их развития задает ориентир в построении содержания профессиональной подготовки в магистратуре педагогического вуза.

Категория содержания профессиональной подготовки также претерпевает изменения: она рассматривается не только как дидактически переработанный социокультурный опыт, но и как личностный опыт преподавателя и студентов. Оно динамично конструируется в совместной деятельности субъектов профессиональной подготовки и может быть различным в зависимости от качества их вовлеченности в совместную деятельность.

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В результате исследования разработан модуль «Теоретико-методические и медико-биологические основы физической культуры и спорта» на электронном курсе «Программа магистратуры 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры и спорта».

Цель данного модуля - формирование у магистрантов, не имеющих базового профильного образования необходимых для получения профессии специалиста по физической культуре и спорту знаний и умений в области теории и методики физической культура и спорта и физиологии спортивной деятельности. Содержание модуля разработано на электронной платформе moodl на электронном курсе «Программа магистратуры 44.04.01 Педагогическое образование, профиль «Образовательные технологии в сфере физической культуры и спорта».

Прохождение модуля являлось для магистрантов, не имеющих базовое образование обязательным, планировалось в первом семестре. Результаты прохождения модуля магистрантов входили в рейтинг-план дисциплины «Физкультурно-оздоровительные технологии в физическом воспитании детей и взрослых», планируемом также в первом семестре.

В результате проведения анкетирования магистранты, обучающиеся на 1 и 2 курсах по направлению подготовки, выразили мнение о целесообразности разработки и внедрения в образовательный процесс данного модуля.

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Alternatively, you can download our basic template from https://globaljournals.org/Template.zip

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4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
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2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

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Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

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The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.

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The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

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One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

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Tips for Writing a Good Quality Science Frontier Research Paper

Techniques for writing a good quality Science Frontier Research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

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5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

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7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

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Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

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23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

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The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

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- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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