Drohobych Ivan Franko State Pedagogical University

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FUNDAMENTALS OF SCIENTIFIC RESEARCH

Teaching Guide

Drohobych
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N 24 **Fundamentals of Scientific Research :** Teaching Guide. Drohobych : Drohobych Ivan Franko State Pedagogical University, 2024. 114 c.

The presented manual is written in accordance with the work program of the academic discipline "Fundamentals of Scientific Research" for the training of specialists (first) of bachelor's degree in the field of knowledge 01 "Education/ Pedagogy", specialties 014 Secondary Education (English Language and Foreign Literature) and 014 Secondary Education (German Language and Foreign Literature), approved by the Scientific and Methodological Council of Drohobych Ivan Franko State Pedagogical University.

The proposed tasks are selected in accordance with the requirements of the program to inform students about the essence of scientific work, its specificity, methodological and theoretical foundations of research, logic, structure, and formatting of various types of research works, as well as in mastering the methodology of independent work.

Bibliography contains 13 titles.

Дрогобицький державний педагогічний університет імені Івана Франка

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ОСНОВИ НАУКОВИХ ДОСЛІДЖЕНЬ

Навчально-методичний посібник

Дрогобич
2024

УДК 001.891(072)
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Рекомендовано до друку вченою радою Дрогобицького державного педагогічного університету імені Івана Франка
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Намачинська Г., Лопушанський В.

Н 24 **Основи наукових досліджень :** матеріали семінарських занять. Дрогобич : ДДПУ ім. Івана Франка, 2024. 114 с.

Поданий посібник написаний відповідно до робочої програми навчальної дисципліни «Основи наукових досліджень» для підготовки фахівців (першого) бакалаврського рівня вищої освіти галузі знань 01 «Освіта / Педагогіка», спеціальностей 014 Середня освіта (Англійська мова та зарубіжна література та 014 Середня освіта (Німецька мова та зарубіжна література), затвердженої науково-методичною радою Дрогобицького державного педагогічного університету імені Івана Франка.

Запропоновані завдання підібрані відповідно до вимог програми з метою інформування студентів про суть наукової роботи, її специфіку, методологічні та теоретичні основи дослідження, логіку, структуру й оформлення різного роду науково-дослідницьких робіт, а також в оволодінні методикою самостійної роботи.

Бібліографія 13 назв.

C O N T E N T S

З М І С Т

ПЕРЕДМОВА

Володіння методологією підготовки наукової роботи є надзвичайно важливим для майбутніх фахівців та науковців. Навчально-методичний посібник «Основи наукових досліджень» буде надзвичайно корисним для студентів, які хочуть оволодіти навичками написання рефератів, наукових статей, тез доповідей кваліфікаційних робіт та інших видів наукових публікацій.

Він включає в себе низку основних аспектів:

Логіка дослідження: роз'яснення того, як правильно структурувати науковий текст, визначати порядок представлення ідей і аргументів.

Форматування та стиль: інструкції з відповідності публікації вимогам жанру. Це може включати правила форматування тексту, використання загальноприйнятого стилю мови, цитування та інші аспекти.

Пошук інформації: навчання методів пошуку, відбору і критичного аналізу наукової літератури.

Етика дослідження: роз'яснення основних етичних принципів у проведенні наукових досліджень та написанні наукових текстів.

Оформлення бібліографії: вказівки щодо правильного оформлення посилань та використання бібліографії.

Підготовка до захисту: інформація щодо підготовки до захисту ваших наукових робіт на конференціях чи захисту курсових, бакалаврських, магістерських робіт.

Цей навчально-методичний посібник буде добрим інструментом для студентів, щоб ефективно орієнтуватися у світі наукових досліджень і публікацій, а також забезпечити їм необхідні знання і навички для написання високоякісних наукових текстів.

У навчально-методичному посібнику «Основи наукових досліджень» розглядаються методологія, методи та способи організації наукових досліджень, вивчення яких сприятиме розвитку раціонального творчого мислення молодих дослідників, організації їх оптимальної розумової діяльності, що, зі свого боку, допоможе

набути необхідного досвіду в організації науково-дослідницької роботи, у використанні методів наукового пізнання, застосуванні логічних законів і правил, що дасть змогу молодим дослідникам не тільки розкрити свій творчий потенціал, а й пройти шлях від дослідника-початківця до молодого вченого.

Основна увага зосереджена на вміннях:

- обґрунтовувати актуальність та мотивувати вибір наукової роботи з обраного фаху;
- під керівництвом викладача виконувати реферати, доповіді на семінарські заняття та наукові конференції студентів, курсові, бакалаврські й магістерські роботи;
- правильно і творчо конспектувати наукові праці, цитувати і робити покликання на цитовані джерела;
- дотримуватися положення про запобігання плагіату;
- визначати мету, завдання, об’єкт і предмет дослідження;
- вибирати адекватні методи та методики для конкретного наукового дослідження;
- визначити теоретичну і практичну цінність наукової роботи;
- добре структурувати наукову роботу;
- логічно, послідовно та відповідно до укладеного плану викладати матеріал;
- робити висновки, адекватні проведеному дослідженню;
- правильно оформляти виконану роботу;
- презентувати результати дослідження з використанням мультимедійних технічних засобів;
- самостійно засвоювати і творчо застосовувати отримані наукові результати на практиці.

Навчально-методичний посібник написаний для бакалаврів, магістрів, наукових керівників і всіх, хто цікавиться та займається науковою роботою.

Автори сподіваються, що посібника стане невід’ємною частиною наукового шляху студента, а також допоможе вдосконалити вміння в області аргументації, методології та наукової комунікації.

PREFACE

Mastery of the methodology of preparing scientific work is extremely important for future professionals and researchers. The methodical guide "Fundamentals of Scientific Research" can be extremely useful for students who want to acquire skills in writing abstracts, scientific articles, conference abstracts, and other types of scientific publications.

Such a guide includes several fundamental aspects:

Research Logic: Explanation of how to correctly structure a scientific text, determining the order of presenting ideas and arguments.

Formatting and Style: Instructions on adhering to the requirements of the publication genre. This may include rules for text formatting, the use of appropriate language styles, citation, and other aspects.

Information Retrieval: Teaching methods of searching, selecting, and critically analyzing scientific literature.

Research Ethics: Explanation of the fundamental ethical principles in conducting scientific research and writing scientific texts.

Bibliography Formatting: Guidelines on properly formatting citations and using bibliography.

Preparation for Defense: Information on preparing for the defense of your scientific work at conferences or defending coursework, diploma, and master’s theses.

Such a methodical guide can be an excellent tool for students to effectively navigate the world of scientific research and publications, providing them with the necessary knowledge and skills for writing high-quality scientific texts.

In the guide "Fundamentals of Scientific Research", the methodology, methods, and ways of organizing scientific research are considered. Studying them will contribute to the development of rational creative thinking among young researchers and the organization of their optimal cognitive activity. This, in turn, will help gain the necessary experience in organizing scientific research work, using methods of scientific cognition, and applying logical laws and rules. It will enable young researchers not only to reveal their creative potential but also to go

through the challenging path from a novice researcher to a young scientist.

The main focus is on developing the following skills:

Justifying the relevance and motivating the choice of a research topic in the selected field.

Conducting abstracts, seminar reports, and scientific conference presentations for students, as well as working on course and master's theses under the guidance of a supervisor.

Effectively summarizing scientific works, citing sources, and making references to cited materials.

Defining the purpose, objectives, object, and subject of research.

Selecting appropriate methods and techniques for specific scientific research.

Structuring scientific work effectively.

Presenting material logically, sequentially, and in accordance with the established plan.

Properly formatting completed work.

Presenting research results using multimedia technical means.

Independently acquiring and creatively applying obtained scientific results in practice.

The guide is designed for bachelor's and master's students, research supervisors, and anyone interested in and engaged in scientific work.

We hope that this guide will become an integral part of your academic journey, assisting you in refining your skills in the areas of argumentation, methodology and scientific communication. We wish you success in your academic development and the attainment of your research goals.

SEMINAR 1
ORGANIZATION OF RESEARCH WORK IN A HIGHER EDUCATIONAL INSTITUTION

1.1. Specifics of the course "Fundamentals of Scientific Research", its subject, purpose and objectives

Science is an integral part of human culture, and therefore, every person should know what science is, what scientific research entails, and how it is conducted. Statistics show that 5–10% of graduates from higher educational institutions become scientists, making scientific activity their profession. They directly engage with science in roles such as government officials, entrepreneurs, and university professors.

In the first case, they contribute to the acceleration of scientific and technological progress. In the second case, they increase their personal income, and in the third case, they focus on professional development and career growth.

In Ukraine, scientific activity is regulated by the "Law of Ukraine on Scientific and Scientific-Technical Activity," which forms the basis for a purposeful policy in utilizing domestic and global scientific and technological achievements to meet social, economic, cultural, and other needs.

The "Law of Ukraine on Higher Education," stipulates that scientific and scientific-technical activities in higher educational institutions are an integral part of educational activities and are carried out with the purpose of integrating scientific, educational, and production activities within the higher education system. It involves:

- The development of various forms of scientific cooperation, including international cooperation, the solution of complex scientific problems, and the implementation of research results and developments.
- The direct participation of participants in the educational process in research conducted at the higher educational institution.

- The planning and execution of scientific research by scientific and pedagogical staff within their primary working hours.
- The organization of scientific, scientific-practical, scientific-methodical seminars, conferences, Olympiads, competitions, and research, course, diploma, master's, and other works for participants in the educational process.

Successful acquisition of research and creative skills by bachelor's, specialists, and master's students helps them easily transition into their professional careers, applying scientific knowledge in practice.

Therefore, most curricula for various specialties include the study of the discipline "Fundamentals of Scientific Research." The goal of the course "Fundamentals of Scientific Research" is to inform students about the nature of scientific work, its specificity, the methodological and theoretical foundations of research, the logic, structure, and formatting of various types of research, and to provide them with the methodology for independent work.

To achieve this goal, the course addresses the following tasks:

- Emphasizing the specificity of scientific work compared to other types of creative work.
- Clarifying the methodological requirements for any scientific work.
- Mastering the requirements for the results of scientific work.
- Properly formulating the title, purpose, tasks, object, and subject of research.
- Determining adequate research methods.
- Structuring abstracts, coursework, thesis, and master's thesis.
- Formatting the list of used literature.
- Drawing conclusions that are appropriate to the conducted research.
- Providing methodological recommendations for the implementation of obtained results in the practice of educational and educational processes.

The content of the "Fundamentals of Scientific Research" course is based on the knowledge acquired by students in previous courses. Therefore, the course's task is to provide a theoretical and practical foundation for the effective and qualified conduct of scientific research by students and masters, both during their university education and in practice.

Questions:

1. **Why is it important for every person to have a basic understanding of science and scientific research, according to the text?**

According to the text, it is important for every person to have a basic understanding of science and scientific research because science is an integral part of human culture, and scientific activity has various implications in government, entrepreneurship, and academia.

2. **What role do government officials, entrepreneurs, and university professors play in the context of science and scientific research in Ukraine?**

In Ukraine, government officials, entrepreneurs, and university professors directly engage with science and scientific research. Government officials contribute to the acceleration of scientific and technological progress, entrepreneurs focus on increasing their personal income, and university professors are involved in professional development and career growth.

3. **How does the "Law of Ukraine on Higher Education" support the integration of scientific, educational, and production activities within the higher education system, as mentioned in the text?**

The "Law of Ukraine on Higher Education" supports the integration of scientific, educational, and production activities within the higher education system by promoting various forms of scientific cooperation, including international collaboration, addressing complex scientific problems, and implementing research results and developments. It also encourages the direct participation of participants in the educational

process in research activities and the planning and execution of scientific research by academic staff. Additionally, it emphasizes the organization of various scientific events and research works for students as an integral part of the educational process, enhancing their research and creative skills.

1.2. The role of student research work in the formation of highly qualified specialists

Student research work plays a pivotal role in shaping highly qualified specialists through various means:

Skill Development: Engaging in research allows students to cultivate critical thinking, problem-solving, analytical, and investigative skills. They learn to formulate hypotheses, gather and analyze data, and draw conclusions – a crucial foundation for professional growth.

Academic Excellence: Research work encourages students to delve deeper into their field of study, fostering a deeper understanding of theoretical concepts and practical applications. This depth of knowledge contributes to their academic excellence.

Innovation and Creativity: It fosters an environment where students can explore innovative ideas, experiment with novel approaches, and think creatively to solve complex problems. This nurtures their capacity for innovation and original thinking.

Professional Development: Through research projects, students often collaborate with faculty mentors or experts, gaining valuable insights, networking opportunities, and mentorship crucial for their future careers.

Preparation for Advanced Study: For students aspiring to pursue higher education or research-oriented careers, engaging in research work during their academic years provides invaluable preparation and a solid foundation for future academic endeavors.

In summary, student research work serves as a catalyst for developing highly qualified specialists by honing critical skills, fostering academic excellence, nurturing innovation, providing professional development, and preparing them for further educational pursuits or specialized careers.

Questions:

1. How does engaging in research work contribute to a student's skill development?

Engaging in research allows students to hone critical thinking, problem-solving, analytical, and investigative skills. They learn to formulate hypotheses, gather and analyze data, and draw conclusions - essential elements for their professional growth.

2. In what ways does student involvement in research foster innovation and creativity?

Research creates an environment where students can explore new ideas, experiment with innovative approaches, and think creatively to solve complex problems. This nurtures their ability to innovate and think outside the box.

3. What role does student research work play in preparing individuals for advanced studies or specialized careers?

Engaging in research during academic years provides students with a strong foundation and valuable experiences. It offers exposure to collaboration with mentors, networking opportunities, and a deeper understanding of their field - essential aspects for pursuing higher education or research-oriented careers.

1.3. Planning of scientific research

Planning scientific research involves several key steps to ensure a structured and effective approach:

Identifying Research Questions/Objectives: Clearly define the research goals and specific questions to be addressed. This step helps in framing the direction and purpose of the study.

Reviewing Existing Literature: Conduct a thorough review of existing literature to understand the current knowledge, identify gaps, and build a foundation for your research.

Formulating a Hypothesis or Thesis: Based on the identified research questions, develop a hypothesis or thesis statement. This serves as a guiding principle for your investigation.

Designing the Research Methodology: Determine the methods, tools, and techniques to collect data or conduct experiments. This includes selecting the appropriate research design, sampling methods, data collection procedures, etc.

Securing Necessary Resources: Identify and acquire the resources required for the research, such as equipment, materials, funding, access to databases, or collaboration with experts.

Creating a Timeline and Work Plan: Establish a timeline outlining the various stages of the research and create a detailed work plan specifying tasks, responsibilities, and deadlines.

Ethical Considerations and Permissions: Ensure compliance with ethical guidelines and obtain necessary permissions or approvals, especially when involving human subjects or sensitive data.

Data Analysis and Interpretation Plan: Determine how collected data will be analyzed and interpreted to derive meaningful conclusions aligned with the research objectives.

Risk Assessment and Contingency Plans: Anticipate potential challenges or risks that may arise during the research process and develop contingency plans to address them.

Documentation and Reporting: Maintain meticulous records of all research activities and results. Plan for regular reporting or documentation to track progress and ensure transparency.

By methodically planning each stage of the research process, scientists can streamline their efforts, maintain focus on objectives, and increase the chances of successful outcomes in their research endeavors.

Questions:

1. Why is it essential to conduct a thorough review of existing literature during the planning phase of scientific research?

Reviewing existing literature helps researchers understand the current state of knowledge, identify gaps, and build a foundation for their study. It informs the direction of research by providing insights into what is known and where further investigation is needed.

2. How does formulating a hypothesis or thesis statement aid in the planning of scientific research?

Developing a hypothesis or thesis statement based on research questions provides a guiding principle for investigation. It outlines a testable prediction or central argument that structures the study and guides the collection and analysis of data.

3. Why is it crucial for researchers to consider ethical considerations and obtain necessary permissions during the planning phase?

Addressing ethical considerations ensures the responsible conduct of research, especially concerning human subjects or sensitive data. Obtaining necessary permissions ensures compliance with ethical guidelines, legality, and safeguards against potential ethical issues that may arise during the research process.

1.4. Forecasting the development of science in general and in a certain specific field of knowledge

Forecasting the development of science involves attempting to predict the trajectory of scientific advancements, breakthroughs, and changes that are likely to occur within the broader scientific landscape and within specific fields of knowledge.

When looking at science as a whole, forecasting involves analyzing global trends, technological advancements, societal needs, and historical patterns to anticipate how scientific disciplines might evolve. This could encompass predicting shifts in research focus, emerging interdisciplinary fields, changes in scientific methodologies, or the impact of technological innovations on scientific discovery.

In the context of a specific field of knowledge, forecasting involves a more targeted analysis. It includes examining current research trends,

the impact of recent discoveries, funding patterns, collaborations, and expert opinions within that field. Researchers might attempt to predict potential breakthroughs, emerging subfields, or paradigm shifts based on existing data, historical trends, and expert insights.

Forecasting in science is valuable for strategic planning, resource allocation, and guiding research directions. While it can provide valuable insights and help set priorities, it's important to acknowledge the inherent uncertainty in predicting the future of scientific development due to the unpredictable nature of scientific discoveries and innovations. Nonetheless, such forecasting exercises aim to provide informed estimations to guide the scientific community in its endeavors.

Questions:

1. How does forecasting in science benefit the scientific community and its progress?

Forecasting helps guide strategic decisions by offering insights into potential scientific advancements, research trends, and emerging fields. It aids in resource allocation, prioritization, and planning, fostering more efficient and impactful scientific endeavors.

2. What factors are typically considered when forecasting scientific development in a specific field?

Forecasting in a particular scientific field involves analyzing ongoing research trends, recent discoveries, funding patterns, collaborations, and expert opinions within that domain. It aims to anticipate potential breakthroughs, emerging areas, or changes based on available data and historical patterns.

3. Is forecasting in science a definitive way to predict future scientific progress?

While valuable for strategic planning, it's important to acknowledge the inherent uncertainty in predicting future scientific development. Science is inherently unpredictable, and unexpected breakthroughs often reshape the landscape. Forecasting offers informed estimations, but the

future of scientific progress remains uncertain due to the nature of scientific discovery and innovation.

1.5. Topicality and effectiveness of scientific research in the field of humanitarian sciences

The topicality and effectiveness of scientific research in the field of humanitarian sciences are fundamental for understanding societal complexities, addressing contemporary challenges, and fostering positive societal change.

Topicality in Humanitarian Sciences:

The field of humanitarian sciences focuses on understanding human behavior, societies, cultures, and ethical considerations. Topicality refers to the relevance and currency of research topics within this field. It involves addressing current societal issues, cultural dynamics, ethical dilemmas, and challenges faced by communities. Research in humanitarian sciences should reflect the urgent needs and emerging trends in society, aiming to provide insights, solutions, or critical perspectives on pressing issues.

Effectiveness in Humanitarian Sciences:

The effectiveness of scientific research in humanitarian sciences relates to its impact and contribution to society. Effective research generates tangible outcomes, influences policy-making, promotes social change, or enhances our understanding of human behavior and societal structures. It goes beyond academic discourse to directly benefit communities, institutions, policies, or practices, leading to positive transformations in various aspects of human life.

Significance of Topicality and Effectiveness:

Topical research ensures that investigations align with contemporary challenges, such as social inequality, human rights violations, cultural conflicts, environmental concerns, or global crises. Effective research leads to actionable insights, interventions, or policy recommendations that address these challenges, contributing to the well-being and progress of societies.

In summary, the topicality and effectiveness of scientific research in humanitarian sciences are pivotal in addressing current societal issues, promoting positive change, and advancing our understanding of human behavior and societal dynamics. These qualities ensure that research remains relevant, impactful, and instrumental in improving the human condition.

Questions:

1. How does topicality contribute to the significance of scientific research in humanitarian sciences?

Topicality ensures that research within humanitarian sciences remains current and relevant by addressing contemporary societal challenges, cultural dynamics, and ethical dilemmas. It allows research to provide insights, solutions, or critical perspectives that align with urgent societal needs.

2. What distinguishes effective research in humanitarian sciences from academic discourse?

Effective research in humanitarian sciences transcends academia by generating tangible outcomes, influencing policies, fostering social change, and directly benefiting communities or institutions. Its impact extends beyond scholarly discussions, contributing to positive transformations in societal aspects.

3. How does the topicality and effectiveness of scientific research in humanitarian sciences contribute to societal progress?

By focusing on current challenges and providing actionable insights or interventions, topical and effective research in humanitarian sciences directly addresses issues like social inequality, cultural conflicts, environmental concerns, and human rights violations. This contributes significantly to societal well-being and progress.

SEMINAR 2
ACADEMIC INTEGRITY AND ITS VIOLATIONS

2.1. A scholar's code of honour

1. A scientist is guided by the principles of human ethics and the principles of good manners in science.

Scientists adhere to the ethical norms of humanity just like all people, but the responsibility of a scientist is greater, considering their higher level of awareness and their belonging to a higher rank in the social hierarchy, as well as the authority inherent to them in society.

Above all, a scientist is guided by the principles of truth and selflessness.

The principles of ethics and good manners are inherent in a scientist's behavior in all aspects of their life, not just in their professional activities.

2. A scientist cannot demand that their colleague or subordinate behave contrary to the principles of good manners in science.

3. A scientist cannot justify their own behavior that goes against the principles of good manners in science, neither by obedience nor loyalty.

4. In cases where the principles of good manners in science contradict other widely accepted value systems, the scientist should make a choice based on their own moral considerations and personal decisions in each case of moral conflict.

5. A scientist recognizes science as an important element of culture and defends it against any unjust accusations.

A scholar should defend every important scientific issue, regardless of temporary inconveniences, with the conviction that:

- in the course of the historical development of science, it leads to the general progress of civilization and the improvement of human well-being;
- science satisfies human natural cognitive needs;
- the dissemination of knowledge about the world improves human habits.

6. A scientist is obliged to resist the improper use of scientific achievements and their direction against humanity.

A scientist should be aware that the results of their scientific work may be used incorrectly, but this should not deter them from conducting pure cognitive activities. At the same time, from a humanitarian point of view, a scientist is obliged to oppose any attempts to use science for any unworthy purpose by:

- warning about all negative consequences of such use;
- refusing to cooperate;
- informing and mobilizing public opinion, including the opinion of the scientific community.

7. A scientist must constantly expand and deepen their knowledge and improve its scope.

8. A scientist must maintain a critical position.

In their professional activity, a scientist respects the opinions of scientific authorities but places facts above these authorities' voices.

A scientist adjusts the decisiveness of their answers to the extent to which they are legitimate.

A scientist should always be ready for questions, review, or rejection of a theory, even their own, if there are contradictions in the facts.

9. A scientist must defend the freedom of science.

The freedom of science is, above all, the freedom to choose a problem, the freedom to choose the method by which the problem is solved, and, above all, the freedom of thought and speech. A scientist agrees to limit freedom of speech and problem choice if such limitation is due to higher reasons (e.g., state secrets) and is established by competent scientific authorities.

A scientist opposes everything harmful to science:

- censorship of speeches and scientific publications;
- restriction of access to primary sources;
- restriction of the free flow of information;
- limitation of personal contacts between scientists.

10. Understanding social needs and limited resources, a scientist should avoid choosing problems of low cognitive level and usefulness.

11. A scientist condemns the use of non-scientific criteria in science.

A scientist should be unbiased and is obliged to expose any forms of discrimination in the scientific world. The evaluation of scientific achievements made according to personal, national, racial, or political views is unacceptable.

12. A scientist does not act dishonestly against another scientist's professional reputation.

However, if there is evidence or justified suspicions that there is activity against the law or good manners, this should be reported to the relevant scientific community.

13. A scientist does not compromise the quality of their work for the sake of income.

A scientist is entitled to honest remuneration for their work. However, if they take on a task, they should strive to perform it to the best of their ability, regardless of the compensation.

Questions:

1. What principles guide a scientist's behavior, and why is their responsibility considered greater than that of the average person?

A scientist is guided by the principles of human ethics and good manners in science. Their responsibility is greater due to their higher level of awareness, belonging to a higher rank in the social hierarchy, and the authority they hold in society.

2. How should a scientist respond when existing rules or internal regulations conflict with their moral values?

If existing rules or internal regulations conflict with a scientist's morality, they should strive to change these rules in accordance with the canons of good manners in science.

3. What is the significance of a scientist defending the freedom of science, and how can they contribute to this defense?

Defending the freedom of science is crucial, and a scientist can contribute by opposing censorship, restrictions on access to information, and limitations on personal contacts between scientists. They should also

strive to make self-governance a permanent aspect of scientific life and should report any activity that goes against the law or good manners within the scientific community.

2.2. A scholar as a creator

The scientist recognizes the results of scientific creativity as the personal property of the creator.

The scientist recognizes international and national copyright laws. A scientist can borrow information from printed publications, provided that he indicates the source and draws a clear line between his own achievements and the achievements of others. Exact reproduction of photographs, figures, tables and large portions of text requires permission from the author or publisher. Such borrowings should be avoided unless they are properly motivated by scientific needs. Citations from foreign articles are possible if there is a need for accurate and detailed perception of foreign scientific opinion.

Manuscripts may be used only with the written consent of the author, indicating the source.

A scientist should be concerned that the recognition of scientific achievements goes to those to whom this achievement really belongs.

Only genuine creative participation justifies the authorship of a scientific work. Editorial and technical assistance should be acknowledged with personal thanks.

Transfer of authorship of a scientific work to another person, acceptance of such authorship and, especially, demand for such transfer is unacceptable. Only the real author of the work can act in this role and cannot be deprived of this right.

The main motive of a scientist should be a passion for knowledge and a desire to enrich scientific achievements. The highest reward is the discovery of the truth and the recognition of the scientific community.

Publication of inaccurate and unconvincing scientific results is unacceptable.

A scientist should take only those tasks for which he has the appropriate knowledge and skills.

Otherwise, he must impartially recommend the person who is best equipped to perform the task.

A scientist should try to complete the task in the simplest way. The scientist is obliged to present the obtained results and conclusions objectively.

Scientific research must be conducted in a way that does not degrade human dignity and does not contradict universal principles.

Research in which a person acts as a subject must be conducted in accordance with internationally recognized principles of deontology. When using a person as a research subject, the principles of conscious voluntary participation in such research, anonymity and confidentiality should be respected. If the research subject is a minor, additional permission should be obtained from his or her parent or legal guardian. The subject must be well informed about the nature, purpose and impact of the research. Animal research must be conducted in a safe manner.

Scientific research should be conducted in such a way as not to destroy the natural environment and existing human creations.

A scientist shares his achievements and knowledge with others.

The primary task of a scientist is to proclaim scientific truth and achieve recognition. A scientist is obliged to present the results of his work truthfully, understanding that inaccuracy in science is harmful both to science and to society. The language of a scientific publication should be clear, logical, understandable and concise.

A scientist does not repeat his scientific publications solely for the purpose of increasing the number of publications.

A scientist is objective in evaluating his own achievements.

A scientist should refrain from self-promotion. The press, radio and television can be used to promote scientific achievements, but not one’s own person.

Questions:

1. What principles guide a scientist in utilizing information from other sources in their research?

A scientist acknowledges international and national copyright laws and indicates sources when borrowing information. Exact reproductions of substantial content need permission. Citations from foreign articles are allowed for accurate perception of foreign scientific opinion, provided there's a scientific need.

2. How does a scientist ensure ethical conduct in research involving human subjects?

When using human subjects, a scientist adheres to deontological principles, ensuring voluntary participation, anonymity, confidentiality, and informed consent. For minors, additional permission from their legal guardian is necessary.

3. What ethical considerations guide a scientist's behavior in the dissemination of scientific knowledge?

A scientist shares knowledge, aiming for scientific truth and recognition without self-promotion. Publications should present truthful results in clear, concise language. Repetition of publications solely to increase their number is avoided to maintain integrity.

2.3. A scholar as a leader

A leader is:

– a dominant personality;

– a person with a quick reaction to the situation and a large selection of means of solving problems;

– a person who stands out from the crowd;

– a person who has the greatest influence on others around him;

– a person who is able to maximally transform the situation for the benefit of himself and others.

Leaders help themselves and others do the right thing. They set direction, create an inspired vision, and offer something new. Leadership is about determining where to go to "win" as a team or organization

The scholar leader is a broadly educated individual with deep content knowledge in at least one specialty area and skills in research, policy, equity and diversity, technology and innovation, global understanding and impact, and multimodal communication.

As leaders, Scholars are focused on providing the team with a validated, sanctioned template by which to measure all work. They're highly organized, methodical and persistent; this individual will encourage their team to take time for thoughtful, careful analysis.

The key figure of a scientific school is its leader. The leader can be an outstanding, authoritative scientist who produces ideas (new directions of research), a scientist who can unite like-minded people around him. It is considered that the leader of the school is only the doctor of sciences (professor).

Scholar as a leader act as transformative and enlivening forces within these systems and themselves transform from a thought leader to a producer of change. They mix his or her knowledge, skills, and leadership abilities to create a regenerating of ideas, solutions, and support.

There are many leadership styles. Some of the most widely discussed include: authoritarian (autocratic), participative (democratic), delegative (laissez-faire), transformational, transactional, and situational. Great leaders can inspire political movements and social change.

A good leader should have integrity, self-awareness, courage, respect, empathy, and gratitude. They should be learning agile and flex their influence while communicating and delegating effectively. See how these key leadership qualities can be learned and improved at all levels of your organization.

When a Scholar is leading a Team, they may struggle to adapt to the team's steady highly social and flexible nature. They may encounter areas of friction, but there are ways they can help their people stretch their behavioral drives and make the team feel like magic.

Is a scholar a good leader?

As leaders, Scholars are focused on providing the team with a validated, sanctioned template by which to measure all work. They're highly organized, methodical and persistent; this individual will encourage their team to take time for thoughtful, careful analysis.

What makes a good leader?

A good leader should have integrity, self-awareness, courage, respect, empathy, and gratitude. They should be learning agile and flex their influence while communicating and delegating effectively.

What are the leadership styles according to scholars?

There are many leadership styles. Some of the most widely discussed include: authoritarian (autocratic), participative (democratic), delegative (laissez-faire), transformational, transactional, and situational.

2.4. A scholar as a teacher

Scholar as a teacher are faculty who actively engage with research in their respective fields of study, and through that, provide unique benefits to their students.

The teacher-scholar model acknowledges the importance of engagement in continuous learning in one's field as a qualification of teaching. It enables faculty to continuously develop new knowledge, integrate scholarship into the learning process, and innovate industry-relevant curriculum.

In 2017–18, the Chancellor's Circle funded several programs that together contributed to the enrichment and success of our students in college. last month, one of these programs – Signature Experiences – was highlighted. We deeply appreciate the opportunity the Chancellor Circle has provided for these student research projects. Your generosity allowed UA Little Rock students to work with faculty on projects that deepened their major and gave them the opportunity to apply their knowledge. This deep learning is a vital part of what our chancellor sees for the future of this university and what the Teacher-Researcher model is all about.

Simply put, scholarly teachers are educators who are actively engaged in research in their respective fields of study and thereby provide unique benefits to their students. These benefits include opportunities for collaborative research, cutting-edge relevance, more opportunities to build strong mentoring relationships with faculty, and most importantly, the opportunity to explore your own creativity in your field of study.

There is a call for the evolution of higher education. The world that our students will inherit will be very different from today. Automation and artificial intelligence will replace a large number of modern professions. To quote a May 2017 report by the Pew Research Center, The Future of Jobs and Learning: "Several studies have documented that vast numbers of jobs are at risk as programmed devices – many of them intelligent, autonomous systems – continue to operate. their march to workplaces.

The workers of the future will learn to deeply develop and use creativity, collaborative activities, abstract and systems thinking, complex communication and the ability to thrive in diverse environments." The future is now, and we know we must serve our students by providing an education that prepares them today for the world of tomorrow.

Universities are mission-driven, and our leadership has taken the position that the key to success at a medium-sized public university located in an urban center like UA Little Rock is to provide strong interdisciplinary research opportunities while offering graduate programs degrees that equip students to thrive in this rapidly changing world. Our chancellor believes that faculty who are vitally involved in research and teaching can empower students to pursue their specialty, apply their knowledge, develop their creativity, and acquire the skills they need to succeed in the future.

Questions:

1. How is a teacher a scholar?

Teacher as Scholars: Have knowledge of interdisciplinary and discipline-specific pedagogical strategies, apply effective strategies to

facilitate learning of a diverse student population, use evidence-based assessment of teaching to improve their pedagogy, and evaluate and analyze their pedagogy.

2. Is a scholar a teacher or a student?

Students are typically defined as individuals who are learning at a school or in a teaching environment, whereas a scholar is often described as a learned person who has exhibited accelerated learning competencies and/or possesses high content knowledge of a particular subject.

3. What is the difference between a scholar and a professor?

The only distinction between a professor and a scholar is the level of research skills and ability and as well as the knowledge gained due to that increased level of research. It makes the scholar the superior academic.

2.5. A scholar as a consultant

1. A scientist expresses their opinion about the work and scientific activity of another scientist honestly, clearly, and impartially. Banal-polite or biased opinions as well as intentionally negative thoughts are not allowed. Preparing an objective critical opinion requires considerable effort, but a scientist should view it as their duty from which they should not evade. A scientist holds particular responsibility for honest and objective opinions regarding candidate and doctoral dissertations.

2. A scientist endeavors to prepare their review in a timely manner. Careless or intentional delays in preparing the review are unacceptable. Access to the assigned work, which someone else can benefit from, is prohibited.

3. When preparing a review for the publication of work, a scientist should assess their competence as an expert for its evaluation and emphasize the work’s suitability, its scientific value, and the absence of obvious errors. Only statements of a scientific nature can be published. The essence of the presentation should enrich scientific knowledge or contribute to its development. It must be formulated with proper precision and criticality. Included calculations should be accurately formulated,

and the text should demonstrate the author's competence in the field of science to which the assessed work belongs.

4. Neither the consultant nor the reviewer of dissertations should engage in preparing their content to an extent that would justify their co-authorship.

5. A scientist ensures that criticism, discussion, and debate occur with respect for the principles of egalitarianism and impartiality. The principle of egalitarianism ensures equal rights for all participants in the discussion or debate regardless of titles and academic degrees. The principle of impartiality excludes personal criticism and condemns distorting the subject of criticism for the purpose of mockery.

Questions:

1. What ethical guidelines dictate a scientist's expression of opinions about another scientist's work?

A scientist should express opinions honestly, clearly, and impartially, avoiding banal-polite or biased opinions, as well as intentionally negative thoughts. They have a duty to provide objective critical opinions, especially concerning candidate and doctoral dissertations.

2. Why is timely preparation of reviews emphasized for scientists?

Timely preparation of reviews is crucial, and careless or intentional delays are unacceptable. This ensures fairness and efficiency in the evaluation process while prohibiting unauthorized access to the assigned work.

3. What considerations should a scientist prioritize when preparing a review for publication?

When preparing a review for publication, a scientist should assess their expertise for evaluation, emphasizing the work's suitability, scientific value, and lack of obvious errors. Only scientifically-oriented statements should be published, enriching knowledge and contributing to scientific development with precision and criticality. The review should also showcase the author's competence in the relevant field of science.

2.6. A scholar as an expert

1. A scientist undertakes the preparation of expertise only in their field of specialization, relying solely on their own experience and knowledge.

2. A scientist begins each expertise with a clear understanding of who the expertise is being conducted for.

3. A scientist conducts each expertise honestly and responsibly, taking into account their existing knowledge and a full grasp of facts and circumstances.

4. When conducting expertise, a scientist does not consider the client's expectations and does not yield to their pressure when presenting expert conclusions.

5. To prevent any suspicions, a scientist refuses to conduct expertise, the partial or final conclusions of which may be associated with their personal interests. In such cases, the scientist must inform the client of the reasons for their refusal.

6. Information obtained during the conduct of expertise should not be used against the client or for personal gain. In the case of a conflict of interest, the scientist should prioritize the common interest over the client's interests.

Responsibilities of a Scientist as an Expert:

Specialization: A scientist acting as an expert must confine their efforts to their area of expertise, drawing solely from their knowledge and experience.

Clear Understanding of Purpose: Before initiating any expertise, a scientist should have a precise understanding of the intended audience or recipient.

Honesty and Responsibility: Scientists are expected to conduct their expertise honestly and responsibly. They should incorporate their knowledge, facts, and circumstances in an unbiased manner.

Objective Conclusions: The expert scientist should not be influenced by the expectations or pressures of the client or any other parties involved. Their expert conclusions should remain objective.

Avoiding Conflicts of Interest: To maintain integrity, experts must decline engagements where their personal interests might interfere with the impartiality of their conclusions. In such cases, the scientist should inform the client of the reasons for refusal.

Ethical Use of Information: The information gathered during the expertise should not be misused to the detriment of the client or for personal gain. Scientists should prioritize the common good over the interests of the client in cases of conflicts.

Questions:

1. What are the key principles guiding a scientist's conduct as an expert?

The scientist, acting as an expert, should confine their efforts to their specialized area, remain unbiased in their assessment, and prioritize honesty, responsibility, and the common interest over personal gain or client expectations.

2. Why is it essential for a scientist to understand the intended audience before conducting expertise?

Having a clear understanding of the audience or recipient ensures that the expert scientist tailors their conclusions and assessments effectively, meeting the specific needs or expectations of the intended audience.

3. What should a scientist prioritize when facing a potential conflict of interest during an expertise?

In cases of conflict of interest, the scientist acting as an expert should prioritize the common interest over the client's interests, ensuring impartiality and integrity in their conclusions and decisions.

2.7. A scholar as a disseminator of science

The role of a scholar as a disseminator of science is multifaceted and impactful, it includes various aspects that contribute to the advancement and propagation of knowledge. Scholars engage in extensive research activities, including conducting experiments, collecting data, and analyzing

findings to uncover new insights and contribute to existing academic discourse. They play a critical role in publishing their research outcomes in academic journals, thereby sharing their discoveries with the wider scientific community and ensuring the dissemination of credible and reliable information.

Furthermore, scholars actively participate in academic conferences, seminars, and workshops, where they present their research and exchange ideas with fellow experts in their field. Through these collaborative efforts, scholars facilitate the sharing of diverse perspectives and encourage the development of innovative solutions to complex scientific challenges.

Scholars also serve as educators, imparting their expertise and knowledge to students at various educational institutions. By designing curricula, fostering a stimulating learning environment, and providing mentorship, scholars inspire the next generation of scientists and researchers. They instill a passion for critical thinking and inquiry, curiosity and a deep appreciation for the scientific method.

Overall, the role of a scholar as a disseminator of science is integral to the growth and development of various academic disciplines, contributing to the enrichment of human knowledge, the fostering of critical thinking, and the promotion of evidence-based decision-making in both academic and public spheres.

2.8. A scholar as a citizen

1. According to their abilities and interests, a scientist should use their knowledge, intellect, and authority in practical activities for the benefit of society.

2. A scientist should participate in the life of their scientific community. A scientist should not unreasonably avoid elective positions within their scientific environment. They should actively engage in the work of collegial bodies. In doing so, their primary focus should be on the general interests of science, followed by the welfare of the main institution.

3. A scientist should not allow the use of their authority in science or their own for propaganda.

4. A scientist who has obtained an administrative or governmental position cannot evade the ethical norms mandatory for the scientific community.

Questions:

1. How do scholars contribute to the advancement of scientific knowledge?

Scholars contribute to the advancement of scientific knowledge through extensive research activities, including conducting experiments, collecting data, and analyzing findings to uncover new insights and contribute to existing academic discourse.

2. What role do scholars play in sharing their research findings with the scientific community?

Scholars play a critical role in publishing their research outcomes in academic journals, thereby sharing their discoveries with the wider scientific community and ensuring the dissemination of credible and reliable information.

3. In what ways do scholars inspire the next generation of scientists and researchers?

Scholars inspire the next generation of scientists and researchers by serving as educators, imparting their expertise and knowledge to students at various educational institutions, designing curricula, fostering a stimulating learning environment, and providing mentorship.

4. Why is it important for a scientist to utilize their knowledge and authority for practical activities benefiting society?

Using their expertise and influence for practical purposes can contribute positively to societal advancement, leveraging their abilities and interests for the greater good.

5. What role should a scientist play within their scientific community according to the guidelines?

Scientist is encouraged to actively participate in the scientific community, engaging in collegial bodies and not avoiding elective positions unreasonably. Their primary focus should be on advancing general scientific interests followed by considering the welfare of their institution.

6. What ethical considerations are outlined for scientists in administrative or governmental positions?

Scientists in administrative or governmental roles are expected to adhere to the ethical norms mandatory for the scientific community. Their position does not exempt them from these established ethical standards.

SEMINAR 3
INTELLECTUAL PROPERTY AND ITS INFRINGEMENT

3.1. The role of intelligence in scientific research is multifaceted and complex. It encompasses several key aspects:

Critical Thinking and Problem-solving:

- Identifying and formulating research questions: Intelligence allows researchers to critically assess existing knowledge, identify gaps and inconsistencies, and formulate meaningful research questions that push the boundaries of understanding.
- Developing and testing hypotheses: Intelligence is crucial in designing rigorous experiments, analyzing data, and interpreting results to draw valid conclusions and support or refute hypotheses.
- Troubleshooting and adapting to challenges: Research is rarely a linear process. Intelligence helps researchers identify and overcome unexpected challenges, adapt methodologies, and find creative solutions to unforeseen problems.

Creativity and Imagination:

- Generating new ideas: Scientific breakthroughs often stem from bold ideas and innovative thinking. Intelligence allows researchers to think outside the box, connect seemingly disparate concepts, and generate novel hypotheses that can lead to significant discoveries.
- Designing novel experiments and approaches: Intelligence fuels the development of new methodologies and research tools, pushing the boundaries of what is possible and enabling scientists to explore previously inaccessible realms of knowledge.
- Visualizing and interpreting data: Intelligence helps researchers see patterns and relationships in complex data sets, leading to valuable insights and deeper understanding of the phenomena under investigation.

Communication and Collaboration:

- Effectively communicating research findings: Intelligence allows researchers to clearly articulate their research goals, methodologies, results, and conclusions in a way that is understandable to both scientific and lay audiences.
- Collaborating effectively with other researchers: Science is a collaborative endeavor. Intelligence facilitates effective communication, teamwork, and coordination among diverse researchers, leading to more comprehensive and impactful research outcomes.
- Disseminating knowledge and engaging the public: Intelligence helps researchers translate complex findings into accessible formats, engage with the public, and increase awareness and understanding of scientific advancements.

Artificial Intelligence (AI) in Scientific Research:

AI is increasingly playing a crucial role in scientific research, augmenting and extending human intelligence. AI techniques are used for:

- Automating data analysis: AI algorithms can process and analyze vast amounts of data efficiently, uncovering hidden patterns and facilitating faster scientific progress.
- Simulating complex systems: AI can simulate complex phenomena that may be difficult or impossible to study directly, providing valuable insights into their underlying mechanisms.
- Generating new research hypotheses: AI can identify new research directions by analyzing large datasets and suggesting relationships and connections that may not be readily apparent to humans.

While AI offers powerful tools, it’s important to remember that it complements, not replaces, human intelligence. The ability to critically evaluate AI outputs, ask insightful questions, and interpret results within a broader scientific context remains essential for successful scientific research.

Overall, the role of intelligence in scientific research is multifaceted and crucial. It encompasses critical thinking, problem-solving, creativity, communication, and collaboration, and it is constantly evolving with the integration of AI technologies. Intelligence remains the driving force behind scientific progress, enabling researchers to expand human knowledge and make significant contributions to society.

Questions:

1. What are some key aspects of the role of intelligence in scientific research?

Critical thinking and problem-solving, creativity and imagination, communication and collaboration.

2. How is AI being used in scientific research?

Automating data analysis, simulating complex systems, generating new research hypotheses.

3. Does AI replace human intelligence in scientific research?

No, AI complements and extends human intelligence, but critical human evaluation remains important)

3.2. Intellectual property: objects and rights to it

Intellectual property (IP) refers to intangible creations of the human mind protected by law. These creations can be anything from inventions and literary works to designs, symbols, and even trade secrets. IP rights grant the owner exclusive rights to control the use, reproduction, and distribution of their creation for a specific period.

Objects of Intellectual Property:

There are four main categories of objects protected by IP law:

1. Copyright: Protects original literary, artistic, dramatic, and musical works, including books, music, films, paintings, and software.

2. Patents: Protect inventions, new processes, or improvements to existing ones. These can be mechanical, chemical, or electrical in nature.

3. Trademarks: Protect distinctive symbols, names, and logos used to identify and distinguish the source of goods or services.

4. Trade secrets: Protect confidential information that gives a business a competitive advantage, such as formulas, processes, or customer lists.

Rights Associated with IP:

IP rights vary depending on the category, but generally grant the owner the following exclusive rights:

- To reproduce the creation: This includes making copies, recordings, or adaptations.
- To distribute the creation: This includes selling, renting, or lending the creation to others.
- To perform the creation: This applies to literary, dramatic, and musical works.
- To display the creation: This applies to artistic works and designs.
- To control derivative works: This means preventing others from creating new works based on the original creation.

Importance of Intellectual Property:

IP protection plays a vital role in:

- Encouraging creativity and innovation: Knowing their creations are protected incentivizes individuals and businesses to invest in new ideas and inventions.
- Promoting economic growth: IP rights stimulate innovation, leading to new technologies, products, and services, thereby driving economic prosperity.
- Ensuring fair competition: IP laws prevent unauthorized copying and ensure fair competition in the marketplace, rewarding creators for their efforts.
- Contributing to cultural development: Copyright protection allows artists, writers, and musicians to earn a living from their work, fostering diverse cultural expressions.

Additional Resources:

- World Intellectual Property Organization (WIPO): https://www.wipo.int/

- United States Patent and Trademark Office (USPTO): https://www.uspto.gov/
- European Patent Office (EPO): https://www.epo.org/en

Questions:

1. What are the four main categories of objects protected by intellectual property law?

Copyright, patents, trademarks, and trade secrets.

2. What are three exclusive rights typically granted to the owner of intellectual property?

To reproduce, distribute, and control derivative works.

3. What are two ways in which intellectual property protection benefits society?

Encourages creativity and innovation, and promotes economic growth.

3.3. Patent protection of intellectual property

A patent is a legal document that grants an inventor exclusive rights to their invention for a limited period (usually 20 years). This means that the inventor has the right to prevent others from making, using, selling, offering for sale, or importing their invention without their permission.

What can be patented?

Not everything can be patented. In general, to be patentable, an invention must be:

- Novel: It must not have been publicly disclosed or known before the patent application is filed.
- Non-obvious: It must not be an obvious modification of known technology.
- Useful: It must have a practical and useful purpose.

How to obtain patent protection:

To obtain patent protection, an inventor must file a patent application with a patent office, such as the United States Patent and Trademark

Office (USPTO) or the European Patent Office (EPO). The application must include a detailed description of the invention, claims that define the scope of the invention, and drawings or illustrations.

Benefits of patent protection:

Patent protection offers several benefits to inventors and businesses:

- Provides exclusive rights: Enables the inventor to control the use and commercialization of their invention, preventing others from exploiting it without permission.
- Incentivizes innovation: Encourages inventors to invest time and resources into developing new inventions by granting them the potential for financial reward.
- Promotes economic growth: Spurs innovation and technological advancement, leading to new products and services that benefit society and drive economic prosperity.
- Facilitates technology transfer: Patents can be licensed to other companies, allowing them to access and use the patented technology, fostering collaboration and knowledge sharing.

Challenges of patent protection:

Patent protection also presents certain challenges:

- Costs: The process of filing and prosecuting a patent application can be expensive, requiring legal and technical expertise.
- Enforcement: Enforcing patent rights against infringers can be time-consuming and costly.
- Limited scope: Patents only grant rights for the specific invention described in the claims, and competitors may develop alternative solutions that circumvent the patent.

Resources for further information:

- World Intellectual Property Organization (WIPO): https://patentscope.wipo.int/
- United States Patent and Trademark Office (USPTO): https://www.uspto.gov/
- European Patent Office (EPO): https://www.epo.org/en

Questions:

1. What are the three main requirements for an invention to be patentable?

Novelty, non-obviousness, and usefulness.

2. What are two main benefits of patent protection?

Provides exclusive rights and incentivizes innovation.

3. What are two challenges associated with seeking patent protection?

Costs and limited scope of protection.

3.4. Owner of intellectual property rights: rights and obligations

Owning intellectual property (IP) comes with both rights and obligations. Let's explore them:

Rights of IP Owners:

- Exclusive rights: Depending on the type of IP, owners have exclusive rights to:
  - Reproduce the creation: Make copies, recordings, or adaptations.
  - Distribute the creation: Sell, rent, or lend it to others.
  - Perform the creation: Applicable to literary, dramatic, and musical works.
  - Display the creation: Applies to artistic works and designs.
  - Control derivative works: Prevent others from creating new works based on the original.
- Commercialization: Owners can benefit financially by licensing their IP to others or selling it outright.
- Transfer rights: IP rights can be assigned to others through contracts or agreements.
- Enforcement: Owners can take legal action against infringers who violate their IP rights.

Obligations of IP Owners:

- Disclosure: Certain types of IP require public disclosure of information, like filing patent applications.
- Compliance with registration requirements: IP rights often require registration with specific government agencies.
- Maintenance fees: Some IP rights, like patents and trademarks, require payment of maintenance fees to keep them active.
- Accurate representation: Owners must not make false or misleading claims about their IP rights.
- Respecting limitations: IP rights are not absolute and have limitations, such as fair use and exhaustion of rights.
- Responsible use: Owners must use their IP rights responsibly and avoid practices that harm competition or consumers.

Additional considerations:

- Co-ownership: In some cases, multiple individuals or entities may own IP rights jointly, requiring shared responsibility and agreement on decisions.
- Employee vs. Independent Contractor: Ownership rights for IP created by employees typically belong to the employer, while those created by independent contractors remain with the individual.
- Contractual obligations: IP ownership can be governed by contracts, such as employment contracts or collaboration agreements, which may define specific rights and obligations.
- Understanding your rights and obligations as an IP owner is crucial to protect your intellectual property and maximize its value. Consult with legal or intellectual property professionals for specific guidance tailored to your situation.

Questions:

1. What are two exclusive rights granted to the owner of intellectual property?

To reproduce and distribute the creation.

2. What are three obligations of an intellectual property owner?

Disclosure, compliance with registration requirements, and payment of maintenance fees.

3. Who typically owns the intellectual property rights created by an employee?

The employer owns the intellectual property rights created by an employee.

SEMINAR 4
RESEARCH WORK OF STUDENTS, ITS FORMS AND ROLE IN THE TRAINING OF SPECIALISTS

4.1. Characteristic features of scientific paper (term paper, bachelor's thesis, master's thesis)

Characteristic features of scientific paper (term paper, bachelor's thesis, master's thesis).

A scientific paper is an independently performed scientific study of a particular problem, which corresponds to scientific principles, has a certain structure, and contains the result and own conclusions.

Scientific papers are for sharing your own original research work with other scientists or for reviewing the research conducted by others. As such, they are critical to the evolution of modern science, in which the work of one scientist builds upon that of others. Papers must be highly readable – that is, clear, accurate, and concise.

The specificity of a scientific paper is that it always has some problem / question that cannot be answered immediately. In order to answer this question, it is necessary to conduct a scientific study.

A good scientific paper presents a problem, reviews past approaches to solve it, and then offers a new, innovative solution.

However, as we were told in the lecture last week, not every student can present something innovative in their research. Of course, it is not impossible. But if the student can't find something new, he just explores the novelty discovered by another scientist, undoubtedly adding his thoughts to the problem.

Scientific research and scientific paper are different things that should not be confused. Scientific research is a type of scientific activity, and scientific paper is a special type of scientific activity – justification of the result of scientific research.

Completion of coursework/term paper is one of the components of training future specialists in a higher educational institution.

Completing a coursework in a foreign language involves achieving both educational and research goals at the same time, because the author of the work, on the one hand, must demonstrate the completeness of learning the educational material, the breadth of familiarization with the literature on a certain problem, and on the other hand – demonstrate the ability to analyze specific language facts, generalize them and make reasonable and correct conclusions.

According to the nature of the work, all term papers are conditionally divided into: *abstract* and *research*.

So, the following main stages of course work are distinguished:

1. Selection of the topic and consultation of the scientific supervisor.
2. Selection and processing of scientific literature on the topic of the course work.
3. Collection and processing of actual material.
4. Writing a draft (coherent, purposeful presentation of the results of self-study, analysis of the collected).
5. Acquaintance of the scientific supervisor with the work, consideration of his considerations, suggestions, remarks.
6. Finalization of course work.
7. Protection.

The volume of the term paper is **25–30 pages of typewritten text**. **The list of used literature – 25–50 sources** with a mandatory reference to them in the text of the work.

A bachelor's thesis is the first creative research work of a future teacher, which is carried out independently and is based on the knowledge, skills and abilities acquired during the study of a cycle of philological and related disciplines at the university.

The bachelor's paper is more effective when it logically continues the problems of the course work or the student's activity in the scientific-student circle. After all, the bachelor's paper should be the result of a deep study of the theory and history of the issue, its creative interpretation and experimental verification.

There are a number of requirements for the bachelor's paper. The main ones are:

- relevance of the topic, its correspondence to the current state of a certain field of science and its development prospects, practical tasks of a modern school;
- study and critical analysis of monographic and periodical literature on the topic;
- study and characterization of the history of the investigated problem and its practical state, as well as advanced pedagogical (if available, own) experience;
- a clear description of the object, subject, goal and methods of research, description and analysis of experiments conducted by the author;
- generalization of the results, their justification, conclusions and practical recommendations.

The volume of the bachelor's paper is 50–60 pages of printed text**. List of used literature 50–75 sources** with mandatory reference to most of them in the text.

A scientific paper, regardless of its type or level (including term papers, bachelor's degree papers, and master's degree papers, etc.), has several specific features and characteristic features that distinguish it from other types of written work. Here are the key characteristics of scientific work and its specifics:

Research orientation: Scientific work always has a research aspect. It is aimed at solving a specific scientific problem or researching a certain aspect.

Scientific Methodology: To conduct a scientific work, recognized methods of scientific research are used, such as empirical observations, experiments, literature analysis, surveys, statistical analysis, etc.

Literary justification: The scientific work includes a literary justification, which includes the analysis of previous studies and other information related to the research topic.

Accuracy and objectivity: The work must be written with accuracy and objectivity. The author should avoid subjective assessments and unfounded assumptions.

Formality and structure: A research paper has a formal structure with specific sections such as introduction, methodology, results, discussion, conclusions and a list of references.

Citations and references: In the scientific work, it is necessary to use correct citations and references to the relevant sources, where the information is taken or the opinion is supported.

Academic style and language: The research paper should be written in a formal academic style, using specialized vocabulary and terms specific to a specific scientific field.

Evidence and reasoning: The author must provide evidence for his claims and justify his conclusions based on data and research results.

Checking for plagiarism: Scientific papers are subject to checking for plagiarism, that is, the use of someone else's ideas, text, or research results without proper citation.

Scientific contribution: Every scientific paper should contribute some new knowledge or understanding to the academic community.

Supplementary Materials: Some research papers may have additional materials such as tables, graphs, charts, or additional experiments.

Length: The length of the paper may differ based on the assignment or institutional guidelines. Term papers are typically shorter than bachelor's and master's degree papers.

These characteristics are specific to scientific work and help to ensure its proper quality, accuracy and reference character. Scientific work is an important tool for developing knowledge and contributing to the scientific community.

A master's thesis is a final qualification thesis of scientific content, which has internal unity and reflects the progress and results of the development of the chosen topic. The totality of the results obtained in such a work should indicate that its author has the skills of scientific work in the field of pedagogical activity.

The main task of its author is to demonstrate the ability to independently conduct scientific research and solve specific scientific problems.

The following structural elements are distinguished in the master's thesis:

1. ***title page*** (indicate: the ministry, the name of the educational institution, the department where the work was performed; the name of the topic of the scientific work; the name of the faculty and specialty, surname, name and patronymic of the author; scientific degree, academic title, surname and initials of the scientific supervisor; city and year of job protection);

2. ***abstract*** (up to 0.5 pages, which reflects the main content of the qualification work);

3. ***table of contents*** (contains names and numbers of initial pages of all sections, subsections and points, as well as introduction, general conclusions, list of used sources, appendices. Headings of the table of contents should exactly repeat the headings in the text);

4. ***introduction*** (reveals the essence and state of the researched problem, for what reasons it was chosen for research and justification of the need to conduct the research. Further, the introduction provides a general description of the scientific work);

5. ***the main part*** (The sections of the main part provide:

- A review of the literature on its topic, where the main stages of the development of scientific thought are outlined. It is desirable to end this section with a brief summary of the need for research in this field.
- An outline of the research methods used during the experiment, develop a general methodology for conducting the research.
- Experimental research and analysis of own results);

6. ***conclusions*** (the main conclusions from the research results and recommendations on the practical use of the obtained results are presented – no more than 8–10 pages);

7. ***a list of used sources*** (only those sources mentioned in the scientific research should be submitted);

8. ***appendices*** (diagrams, schemes, graphs, tables, lesson notes, methodological developments, illustrations, etc.).

The volume of the master's work is 80–100 pages of printed text. A specialist with the educational and qualification level "Master" must possess the methodology of scientific creativity, modern information technologies, methods of obtaining, processing and recording scientific information.

Master's students of the Institute of Foreign Languages submit, after the list of used literature, a resume in a foreign language (or English, or German, or French), up to three pages of printed text.

Questions:

1. What is a scientific paper? Its specificity.

A scientific paper is an independently performed scientific study of a particular problem, which corresponds to scientific principles, has a certain structure, and contains the result and own conclusions.

Scientific papers are for sharing your own original research work with other scientists or for reviewing the research conducted by others. They must be highly readable - that is, clear, accurate, and concise.

The specificity of a scientific paper is that it always has some problem/ question that cannot be answered immediately. In order to answer this question, it is necessary to conduct a scientific study.

2. What does completing a coursework in a foreign language involve?

Completing a coursework in a foreign language involves achieving both educational and research goals at the same time, because the author of the work, on the one hand, must demonstrate the completeness of learning the educational material, the breadth of familiarization with the literature on a certain problem, and on the other hand – demonstrate the ability to analyze specific language facts, generalize them and make reasonable and correct conclusions.

3. What are the key characteristics of scientific paper?

- **Clear Structure:** Scientific papers follow a clear structure with sections like introduction, methodology, results, discussion, and conclusion, making it easy for readers to follow the research process.
- **Evidence-Based:** Scientific papers rely on empirical evidence and data to support their claims, making them credible and reliable sources of information.
- **Objective and Formal Language:** Scientific papers use a formal and objective language, avoiding personal opinions or emotions and focusing on facts and findings.
- **Contribution to Knowledge:** They make a unique contribution to the field by presenting new findings, insights, or theories, adding to the collective body of scientific knowledge.

4.2. Selection of the topic and study of relevant scientific literature

Selecting a topic and studying relevant scientific literature is a crucial step in any research or academic project.

Therefore, it is important to prepare well before starting work. So, first

Identify Your Interests and Goals:

• Start by thinking about your interests, passions, and goals. What subject area fascinates you the most? What do you want to achieve with your research or study?

Narrow Down Your Focus: `

• Once you have a broad area of interest, narrow it down to a specific topic or research question. Be as specific as possible, as this will make your literature search more manageable.

Start researching:

• Begin with a basic online search or use academic databases like Google to see what has already been published in your chosen area.

Review Existing Literature:

• Read existing scientific literature related to your topic. Pay attention to key findings, methodologies, and gaps in the literature. Take detailed notes to help you remember important points.

Organize Your Research:

• Create a system for organizing the literature you find. Tools like reference management software (e.g., EndNote, Zotero, Mendeley) can help you keep track of references.

Define Your Research Questions or Objectives:

• Based on your review of the literature, refine your research questions or objectives. Make sure they are clear, specific, and relevant to your topic.

Create an Annotated Bibliography:

• Summarize each relevant article or paper in an annotated bibliography. Include key points, methodologies, and the significance of each source.

Identify Key Concepts and Theories:

• Identify the key concepts, theories, and frameworks that are relevant to your topic. Understanding the theoretical foundations of your research can guide your work.

Look for Recent Publications:

• Ensure that you include recent publications in your literature review to stay up-to-date with the latest research in your field.

Evaluate the Quality of Sources:

• Assess source credibility, giving preference to peer-reviewed journals.

Identify Research Gaps:

• As you review the literature, look for gaps or areas where further research is needed. Your study should contribute to filling these gaps.

Create a Literature Review:

• Write a comprehensive literature review that synthesizes the key findings and concepts from the sources you've reviewed. Discuss how your research fits into the existing body of knowledge.

Cite Your Sources Properly:

• Make sure to cite all the sources you've consulted following the appropriate citation style (e.g., APA, MLA, Chicago).

Seek Feedback:

• Share your literature review with peers, mentors, or advisors to get feedback and suggestions for improvement.

Update Your Research as Needed:

• Throughout your research process, be open to revising your research questions or objectives based on new insights from the literature.

Stay Organized and Document Everything:

• Keep careful records of all the sources you consult, your notes, and your evolving research plan.

Remember that the process of selecting a topic and studying relevant scientific literature is continuously improving (iterative). You may need to revisit and revise your research questions or objectives as your understanding of the topic deepens through your literature review.

Questions:

1. Why is it important to identify your interests and goals when selecting a research topic?

Identifying your interests and goals is crucial because it helps you stay motivated and focused throughout your research journey. When you are passionate about a subject area and have clear objectives, you are more likely to stay committed and produce meaningful research.

2. What are the benefits of narrowing down your research focus to a specific topic or research question?

Narrowing down your research focus makes your literature search more manageable. It allows you to delve deeper into a specific area, leading to a more focused and meaningful research study. It also helps you avoid getting overwhelmed by the vast amount of information available.

3. What role does an annotated bibliography play in the research process, and why is it valuable?

An annotated bibliography is a valuable tool for organizing and summarizing the key information from the sources you've consulted. It provides a quick reference to the main points, methodologies, and significance of each source. This resource streamlines the literature review process, making it easier to synthesize information and identify trends or patterns in the research.

4.3. Requirements for the title, setting the goal and formulating the tasks of the scientific work

The question of how to correctly formulate the title – arises before everyone who starts working scientific work.

So, the first requirement for the title of a scientific paper is as follows: the title (title) of a scientific paper should be as small as possible a set of words that adequately reflects the content of the scientific paper. The maximum number of words in the title is 12. The optimal number of words in the title is 9+/-3.

– the title of a scientific paper should be determined by its main result.

This requirement can be fully fulfilled only when the scientific research is completed and the result is obtained in a refined form. When writing a scientific paper, as a rule, in the course of the work itself, it is necessary to conduct additional research, clarify something, sometimes more or less significantly change the obtained results. Therefore, when starting to write a scientific paper, you should adopt the so-called "working title", which can be changed later.

– to correctly choose the title of a scientific work, it is necessary to successfully find its keyword.

To do this, you need to ask: 1. What is claimed in the scientific work and 2. What exactly is claimed?

The correct choice of a keyword (or several words) is necessary. It should be formulated in such a way that it **becomes clear to the reader that the title of the proposed work is a keyword.**

Sometimes the headings start with vague words, such as "Exploring the question...", "Exploring some ways...", "Some questions...", "Materials to study... **Such words do not give an idea of what will be discussed** in the content of the work. Therefore, the choice of such titles is illegal, because they do not have a keyword that would indicate the main result of the work.

It is very important to pay attention to **the acceptability of the terminology of the titles.** There are also requirements here:

1) use understandable, clear and short words. The terms in the title should be limited to only those words that indicate the essential content of the work **2) avoid abbreviations, slang words, unusual and out-of-date terminology in the titles.**

– **the title should be neither too narrow nor too broad in relation to the results presented in the scientific work.** the title should summarize these individual results

In the introduction (no more than 5 pages), the essence and state of the study of the scientific problem and its significance, the grounds for the development of the topic, and the justification of the need for research are disclosed.

Next, the general characteristics of the work are presented in the following sequence: Actuality of theme.The relevance of the topic are substantiated by critical analysis and comparison with known solved problems.

It is generally accepted when explaining relevance to indicate the surnames and initials of leading scientists in Ukraine and the world as a whole who are engaged in research in this field. At the same time, it is required that the list of used sources must mention the works of scientists.

Requirements for the Title of a Scientific Work

1. The title should be a minimal set of words that accurately represent the content, ideally within 9+/-3 words, and never exceeding 12 words.

2. Reflect Main Result: The title should encapsulate the main result or outcome of the research.

3. Keyword Identification: It should prominently feature a keyword or keywords that reflect the core focus of the work.

4. Clear and Understandable Language: The terminology in the title should be clear, precise, and avoid abbreviations, slang, or outdated language.

5. The title should neither be too narrow nor too broad, effectively summarizing the main results.

Questions:

1. How should the relevance of a scientific topic be explained in the introduction of a research paper?

The relevance of the topic should be explained by conducting a critical analysis and comparison with known solved problems, substantiating the significance of the research for the relevant field of science or production.

2. What is the main purpose of stating the goal in the introduction of a scientific work?

The main purpose of stating the goal in the introduction is to inform the reader about the main results, enabling them to decide if the work is of interest. It also helps in presenting the material logically and clarifies the general idea of the proposed results.

3. How should the tasks of a scientific work be formulated, and what should they reflect?

The tasks of a scientific work should be formulated as a general research plan, reflecting everything the researcher plans to do to successfully achieve the set goal. Typically, 4–5 basic tasks are outlined to achieve the goal.

They should be described in a logical sequence, allowing for understanding of the research path and logical progression of the study.

4.4. Requirements for the result of scientific research

In this part of the work, the most important scientific and practical results obtained during independent research, which contributed to the solution of the scientific problem (task), are presented. In the conclusions, it is necessary to emphasize the quantitative indicators of the obtained results and the justification of the reliability of the results. Next, recommendations are formulated regarding the scientific and practical use of the obtained results.

It is recommended that the conclusions be numbered and their number should not be less than the number of tasks set in the work.

Conclusions should contain sentences on the scientific novelty and practical value of the results obtained in the work. There may be additional statements such as "It has been proven that...", "It was discovered for the first time that...".

The volume of conclusions of the work should not exceed 4–6 pages.

The result of the research becomes the result of scientific work and is, in a certain sense, its conclusion. Scientific work and scientific research do not necessarily have to be the result of the activity of the same person (author). The author of a scientific work can use the results of other researchers. It all depends on the status of the scientific work. For example, there is no mandatory requirement for the scientific novelty of the research result for a course or diploma work. And this means that the result can be taken from other authors, but more or less independently interpreted and substantiated by the student in his course or diploma work. For a master's thesis, at least some element of the novelty of the result is desirable.

For dissertations, it is already a mandatory requirement that the result was obtained by the dissertation student (author) independently. This requirement is recorded in the regulations on the procedure for

awarding scientific degrees and scientific knowledge. It is very important for the author of the dissertation to highlight the results obtained by him personally.

Thus, authors of scientific works (dissertations, master's, diploma and course works) need to correctly formulate the results, which involves the fulfillment of the following methodological requirements:

1. Results must be concrete judgments.

Results must be statements that clearly and specifically state the objects about which something is asserted and the properties attributed to those objects.

2. The main concepts (terms) in the formulation of the result of scientific work must be clearly defined.

The need to define the main concepts in judgments expressing the results of scientific work is dictated by the fact that without this it is impossible to establish their truth, neither what is claimed nor what is claimed.

3. The truth of the result of scientific work must be substantiated.

Solving this problem is the main responsibility of the author of a scientific work. Defining the main concepts of scientific work is only an auxiliary task, the solution of which is necessary to justify the results of this work.

4. If the author of a scientific work claims to receive personal results, then these results must be clearly highlighted or the author must indicate the difference between his results and the results of other authors.

This requirement is not mandatory for term papers and diploma papers, but applies primarily to dissertation papers, the authors of which claim to receive scientific degrees awarded only for their personal new results.

5. The novelty of the result must be substantiated by comparing the author's result with other results.

As already mentioned above, novelty is not a necessary requirement for a course or diploma work. But the results of some kind of scientific

works (for example, dissertations, scientific monographs and articles) are subject to requirements of novelty and relevance.

New ways of solving problems proposed by the author must be strictly argued and critically evaluated in comparison with known solutions from all aspects, including efficiency.

Relevance of scientific work.

If the requirement of relevance is presented to the scientific work, then the author must indicate specific scientific and practical tasks that could, on. in the opinion of the author, to be solved with the help of the results obtained by him.

The requirement of relevance is especially important for dissertations. The main thing in scientific work is its result. Therefore, the relevance of scientific work is primarily determined by the relevance of its result. Given this circumstance, it is appropriate to equate the relevance of scientific work with its relevance as the possibility of using the result to solve scientific and practical tasks.

However, the relevance of a scientific work should not be confused with its novelty, because a new result may not necessarily be relevant, just as a relevant result is not necessarily new.

We focused on the results of scientific works in such detail because they determine the specifics of all parts of the scientific work and their relationship, that is, the structure of these works. Having clarified the specific and essential characteristics of the result of scientific work, it is possible to formulate the essential features of the scientific work itself.

Thus, from a logical-methodological point of view, scientific work is a justification of the answer (i.e., the result of scientific research) to a question that contains entropy (some uncertainty), that is, a justification of the main result of scientific research. At the same time, each finished part of a scientific work (chapter, paragraph, etc.) is also a scientific work. Scientific research and scientific work are different things that should not be confused. Scientific research is a type of scientific activity, and scientific work is a special type of scientific activity – justification of the result of scientific research. At the same time, the essence of scientific research, the methods of obtaining the result will be predicted by the

data (which in our specific case and for each field of knowledge will be different) and will not be considered by us.

Questions:

1. What is the primary purpose of the conclusions section in a research work, and what aspects should be emphasized within it?

The primary purpose of the conclusions section is to present the most important scientific and practical results obtained during independent research, emphasizing quantitative indicators and the justification of result reliability. It should also include recommendations for the scientific and practical application of the obtained results.

2. Why is it essential to define main concepts and terms in the formulation of research results, and how does this relate to establishing their truth?

Defining main concepts and terms is crucial because it helps establish the truth of research results. Without clear definitions, it's impossible to verify the validity of the claims made in the results.

3. Why is it necessary to compare the author's results with other existing results to substantiate the novelty of the research, and which types of scientific works require this comparison?

Comparing the author's results with existing results is necessary to substantiate the novelty of the research. This comparison is particularly important for scientific works like dissertations, scientific monographs, and articles, which have requirements for novelty and relevance. It ensures that the author's proposed solutions are rigorously evaluated against known alternatives, including their efficiency.

SEMINAR 5
METHODOLOGICAL PRINCIPLES OF SCIENTIFIC RESEARCH, CONTENTS AND STAGES OF RESEARCH WORK

5.1. Requirements for the main contents of scientific paper. Division of the main issue (problem) into auxiliary sub-issues and construction of a plan of scientific paper

The main part of the thesis consists of sections, subsections, points, and subpoints. Structurally and more or less proportionally in terms of page volume, it is recommended to divide it into two to three sections.

The main text of each section may be preceded by an introduction with a brief description of the chosen direction and justification of the research methods applied. At the end of each section, brief conclusions are formulated, allowing for the extraction of general conclusions from unnecessary details.

In the first section of the thesis, theoretical foundations and a brief history of the posed problem are presented. The student, through a literature review, outlines the main stages of the problem's development and highlights their place in its resolution, identifying unanswered questions.

In the following sections, the results of the author's own research are presented in detail, emphasizing what new contributions they bring to the problem's development.

The sections of the main part should be logically interconnected. Theoretical positions should serve as the basis for the analysis of primary materials or statistical information, and the conclusions and proposals should be based on the presented theoretical positions and the conducted analysis.

Dividing the main issue (problem) into auxiliary sub-issues and constructing a well-organized plan for your scientific paper is a crucial step in the research and writing process. Here's a step-by-step guide on how to do this:

Step 1: Define the Main Problem

Identify and clearly define the main problem or research question that your scientific paper aims to address. This should be a concise statement that encapsulates the core issue you are investigating.

Step 2: Brainstorm Sub-Issues

Consider the main problem from different angles and perspectives. Break it down into smaller, related sub-issues or research questions that need to be addressed to fully understand the main problem. These sub-issues should serve as the building blocks of your paper.

Step 3: Prioritize Sub-Issues

Once you have a list of sub-issues, prioritize them based on their significance and relevance to the main problem. Some sub-issues may be foundational and must be addressed before others, while some may provide context or support to the main argument.

Step 4: Organize Sub-Issues into Sections

Now, organize the sub-issues into sections of your scientific paper. Each section should correspond to a specific sub-issue or group of closely related sub-issues. Common sections in a scientific paper include the Introduction, Methods, Results, Discussion, and Conclusion, but you can have additional sections if needed.

Step 5: Create an Outline

Construct a detailed outline of your scientific paper, outlining what content will go into each section. Within each section, outline the specific points, arguments, or data you plan to include. This will help you maintain a logical flow and ensure that you cover all necessary sub-issues.

Step 6: Revise and Refine

Review and refine your outline as needed. Ensure that each sub-issue is adequately covered and that the logical progression from one section to the next is clear.

Step 7: Write Your Paper

With the well-structured outline in hand, you can now start writing your scientific paper, expanding on each section while addressing the

sub-issues you've identified. Be sure to maintain coherence, logical flow, and proper citation throughout the paper.

By breaking down the main problem into sub-issues and constructing a plan using this structured approach, you'll have a solid foundation for writing a well-organized and comprehensive scientific paper.

Questions:

1. Why is it important to prioritize sub-issues when dividing the main problem in a thesis?

Prioritizing sub-issues is essential because it helps researchers focus their efforts on addressing the most critical aspects of the problem first. This ensures that the thesis addresses the core issues effectively and provides a clear structure for the research.

2. What role does the introduction play in each section of the thesis?

The introduction in each section provides a brief overview of the chosen direction and justification of the research methods applied. It sets the stage for the reader by explaining the context and objectives of that particular section.

3. What is the purpose of presenting the theoretical foundations and history of the problem in the first section of a thesis?

The first section serves to provide a comprehensive background by presenting the theoretical foundations and a brief history of the problem. This helps the reader understand the context, evolution, and significance of the research question within the field of study.

5.2. Requirements for the entry of scientific work. Relevance of the topic and justification of its choice. Characteristics of the current state of the issue

Relevance of the Topic: The introduction should elucidate why the chosen topic is pertinent and significant in the current context. It should

showcase the importance of the research in addressing a gap, solving a problem, or contributing to existing knowledge.

Justification of Topic Choice: Explain the reasons behind selecting this specific topic. This may involve outlining the gap in existing literature, highlighting the societal or scientific importance, or explaining personal motivation or interest.

Characteristics of the Current State of the Issue: Provide an overview of the present status of the subject matter. Discuss the existing knowledge, theories, or practices related to the topic. This section establishes a baseline understanding and context for the research that follows.

In essence, the introduction of a scientific work serves as a foundation, setting the stage for the research that follows by explaining why the topic is relevant, justifying its selection, and providing an overview of the current state of the issue.

Questions:

1. Why is it crucial for the introduction of a scientific work to emphasize the relevance of the chosen topic?

Highlighting the topic's relevance establishes its significance in addressing a gap, solving a problem, or advancing existing knowledge, underscoring the research's importance in the current context.

2. How does the justification of topic choice contribute to the introduction of scientific work?

The justification elucidates the reasons behind selecting a specific topic, whether it's identifying gaps in existing literature, emphasizing societal or scientific importance, or explaining personal motivation. This provides a clear rationale for pursuing the research.

3. What purpose does outlining the characteristics of the current state of the issue serve in the introduction?

Providing an overview of the present status of the subject matter establishes the baseline understanding and context for the research that follows. It helps situate the study within the existing knowledge, theories, or practices related to the topic.

5.3. Object and subject of scientific research

The object and subject of scientific research delineate the scope and focus of a study:

Object of Research: This refers to the broader, more abstract aspect or phenomenon being studied. It's the overarching theme or concept that the research aims to investigate. For example, in psychology, the object of research might be human behavior, while in astronomy, it could be celestial bodies.

Subject of Research: The subject is the specific, defined area or aspect of the object that the research directly examines or analyzes. It represents the narrower focus within the broader object. For instance, within the object of human behavior, the subject might be a particular behavior like decision-making processes or social interactions.

In essence, the object provides the context or larger framework of the study, while the subject narrows down the focus to a specific aspect or element of that context for detailed investigation.

Questions:

1. How do the object and subject of scientific research differ in their roles within a study?

The object represents the broader, abstract aspect under study, setting the overarching theme, while the subject defines the specific, focused area within the object, guiding the detailed investigation.

2. Can you provide an example illustrating the relationship between the object and subject of research?

Certainly, in the field of biology, the object of research could be "ecosystems," while the subject might be "the impact of invasive species on local biodiversity." Here, ecosystems serve as the broader context (object), and the specific focus (subject) is on the impact of invasive species within these ecosystems.

3. How do the object and subject of research contribute to defining the scope of a scientific study?

The object outlines the overarching theme or concept being studied, providing the larger framework, while the subject narrows down the focus within that framework, determining the specific area or aspect that the research aims to examine in detail. Together, they delineate the boundaries and focus of the study.

5.4. Research methods and their classification

In the study of linguistic phenomena, researchers use general scientific research methods – induction and deduction, analysis, and synthesis.

Induction is a research technique where, based on the study of individual phenomena, a general conclusion is drawn about the entire class of these phenomena, generalizing the results of specific observations. Most linguistic research is based on an inductive approach to studying linguistic facts.

Deduction is a form of valid reasoning from general premises to a specific conclusion. It involves deriving a new true proposition from one or more other true propositions based on the laws of logic. Deduction is widely used in mathematics.

Hypothesis is a way of cognitive activity, constructing probable, problematic knowledge when one of the possible answers to a question that arises during research is formulated; one of the possible solutions to a problem. The essence of a hypothesis lies in making assumptions about the internal structure of an object, the relationships between its elements, and its subsequent experimental verification. A hypothesis remains a conjecture or guess until it is tested. Once proven through experimentation, a hypothesis becomes a scientific theory.

Analysis is a method of cognition that allows breaking down an object into parts for a detailed study.

Synthesis, on the other hand, is the result of combining individual parts or features of an object into a unified whole.

Analysis and synthesis are interconnected and represent a unity of opposites. Depending on the level of understanding of the object and the depth of insight into its essence, different types of analysis and synthesis are applied.

Direct or empirical analysis and synthesis are used at the stage of superficial acquaintance with the object. This involves identifying individual parts of the object, discovering its properties, and collecting surface-level data. This type of analysis and synthesis provides an understanding of the phenomenon but is insufficient for penetrating its essence.

Only the unity of analysis and synthesis ensures an objective and adequate reflection of reality.

5.5. Basic linguistic methods

The oldest and most widespread basic linguistic method is descriptive linguistics.

1. Descriptive Linguistics Method: Descriptive linguistics involves systematically inventorying linguistic units, explaining the features of their structure and functioning at a specific (given) stage of language development, i.e., in synchrony.
2. Comparative-Historical Method: This method comprises a set of techniques and procedures for conducting historical-genetic research of language families and groups, as well as individual languages, to establish patterns in their development.
3. Linguistic Geography (Areal) Method: The linguistic geography method involves mapping elements of language that distinguish its dialects. It is used to study and interpret the spatial distribution of linguistic phenomena.

Contrastive Method (Typological Method) – a set of research techniques and description of language through its systematic comparison with another language to identify its specific features.

The contrastive method is related to the issues of linguistic typology and universals (these linguistic categories are the result of applying the contrastive method).

Linguistic typology is the comparative study of structural and functional features of languages independently of their genetic nature.

Language universals are essential properties and important characteristics present in all languages or most of them.

Structural Method – a method of synchronous analysis of linguistic phenomena based solely on the relationships and connections between linguistic elements.

This method emerged in the 1920s as an antithesis to the comparative-historical method. The works of Ferdinand de Saussure and Igor A. Boduen de Courtenay played a significant role in the development of structural linguistics. The main ideas of structuralism can be summarized as follows:

1) the real entity is not an individual fact (sound, morpheme, word, etc.) but the language as a system; a system does not consist of elements; it determines these elements;

2) relations dominate over elements, with oppositional relations being the most significant;

3) since relations are fundamental in language, mathematical methods can be applied to its study.

The goal of the structural method is to study language as a complete functional structure, where the elements and parts are related and interconnected by a strict system of linguistic relations.

The structural method is implemented through four techniques: distributive analysis, immediate constituents analysis, transformational analysis, and componential analysis.

Distributive Method: The fundamental principles of distributive methodology were developed by Leonard Bloomfield in the 1920s and further developed by Zellig Harris in the 1930s – 1950s. Distribution (Latin: distributio – distribution) refers to the set of all contexts in which the studied element occurs, distinguishing it from the contexts of other elements.

Distributive analysis is a research method that studies language based on the distribution (occurrence) of individual units in the text.

Immediate Constituents Analysis: This technique presents the word-formation structure of a word and the syntactic structure of word combinations and sentences in the form of a hierarchy of component elements.

Transformational Analysis: Transformational analysis is an experimental technique used to determine syntactic and semantic similarities and differences between linguistic objects by examining the similarities and differences in their sets of transformations.

Componential Analysis: Componential analysis is a system of techniques for studying word meanings by breaking down a word's meaning into component parts called semes, semantic features, and occasionally markers. Lexical units differ or combine with each other based on these features. The identification of the components in a lexical unit is achieved by comparing it with other units that share semantic commonalities.

Questions:

1. What are the primary research methods used in the study of linguistic phenomena, and how do they contribute to our understanding of language?

The primary research methods in linguistic studies include induction, deduction, analysis, and synthesis. Induction involves drawing general conclusions from specific observations, while deduction uses logic to derive specific conclusions from general premises. Analysis breaks down objects for detailed study, while synthesis combines individual parts into a unified whole.

2. Can you explain the relationship between analysis and synthesis in linguistic research and how they work together to provide a comprehensive understanding of language?

Answer: Analysis and synthesis are interconnected and represent a unity of opposites in linguistic research. Analysis involves breaking

down objects into parts for detailed study, while synthesis combines these individual parts into a unified whole. Together, they ensure an objective and adequate reflection of linguistic reality.

3. What are the fundamental principles of the structural method in linguistics and how does it differ from the comparative-historical method?

Answer: The structural method in linguistics focuses on studying language as a complete functional structure, emphasizing the relationships and connections between linguistic elements. It differs from the comparative-historical method, which examines the historical-genetic aspects of languages and their development patterns

5.6. Research methods in Pedagogy

Modern pedagogy uses the following methods of pedagogical research: pedagogical observation, conversation, interview, experiment, study of products of activity, sociological methods, sociometric methods, testing, etc.

Whatever the goals, objectives and organization of pedagogical research (except for research of a historical nature), they can be implemented based on the observation method. The method of observing the law occupies a central place in research work as the main source of obtaining facts. Even highly abstract theories ultimately proceed from the provisions formulated on the basis of observations.

It should be noted that observation and perception are not identical concepts, since perception is a mental act, an action, and observation is a method of cognition of the pedagogical process as a phenomenon, and it cannot be an ordinary perception of something because it is directly aimed at finding and identifying facts in accordance with the goal and tasks of the study. This is its main function. In pedagogical knowledge, observation has its own characteristics. The main one is the continuous connection of the observer with the object of study, which leaves an imprint on both perception and interpretation of pedagogical processes.

Types of observations in pedagogical research.

As the analysis of scientific sources shows, one of the main circumstances that determine the superiority of a certain type of observation is the position of the researcher. There are three main positions:

1) researcher – neutral person;

2) researcher – head of educational and educational actions;

3) the researcher is an accomplice of the observed process or phenomenon. For better orientation in a large number and varieties of observations, consider their characteristics.

Direct (direct) observation. Direct or immediate is such an observation when there are direct relations between the object and the observer, connections established without intermediate links, and the researcher studies the living process or phenomenon, and not their reflection, description, reproduction, etc. Direct observation gives material from the original source, and therefore its data are the most reliable for comprehension.

The reliability of the information obtained in many cases depends on the position of the researcher himself in direct observation. Many scientists prefer neutral observation when the observer acts as a witness to the process under study.

The researcher is an observer (witness). In this case, there may be two options. The first option is when the observer is, as it were, on the side of the situation under study and does not at all participate in the activities of the observed people. This is the so-called unconnected observation. A typical example of non-inclusive observation can be considered observation of mass forms of extracurricular and extracurricular work, contests of professional skill, other mass events at school and extracurricular institutions, when the researcher must be at a considerable distance from the object of observation in order to see the entire course of the educational process or observe the atmosphere in which the event takes place.

The second option is an observation in which the observer, although taking a neutral position to the phenomena under study, is known to examiners; the observer is present during the passage of the pedagogical

process and can make certain adjustments to its implementation (elements of experimentation). This is the so-called included observation. Practice shows that the presence of an observer distorts the course of the process under study. Tracking the reaction of students when attending lessons confirms that there are deliberate and unintentional demonstrations. The first is explained by a completely natural desire to show the outsider all the best. The second is the result of tightness and a heightened sense of self-control in the presence of strangers.

The researcher is the head of educational and educational actions. This position of the researcher creates the most favorable opportunities for observation. A teacher or researcher associated with a school or other educational institution has significant advantages over persons who do not work directly in this area. The position of the leader allows the scientist, the teacher to manage the development of the pedagogical phenomenon or process; regulate the course of activity, direct it according to the planned plan (program); intentionally create the necessary situation.

In this case, the objects of observation are:

a) the system of its own internal actions, which are determined by the settings and adjusted objectively by the circumstances created;

b) the system of its own external actions, which are carried out automatically under the influence of the installation and the actual situation;

c) a system of external and internal actions of students, which are carried out according to tasks and individual settings.

It should be noted that in such a situation, no matter how demanding the organizer of the study is, his external actions (voice, speech, facial expression, posture, etc.) are not fixed by observation in all details.

Quite interesting, according to many researchers, is the position when the researcher is an accomplice in the process or phenomenon under study. In this case, neither the true face nor the tasks and goals of the researcher are known to the examiners

Indirect (indirect) observation. Often there is a need to supplement the materials of direct observation, in their correction by indirect

observation, which is carried out through authorized persons. This may be one or a group of observers working on the tasks and program of the researcher. For example, teachers of the Pedagogical Institute, managers-methodologists of pedagogical practice should be involved in the indirect observation of students. This will allow you to conduct comprehensive research on a particular problem or study problems from the fields of sciences related to pedagogy.

The above-described types (direct and indirect) of observation can have both open and hidden (hidden) content.

Open observation occurs in the conditions of the fact of the presence of unauthorized persons realized by the teacher and students. It should be noted that the pedagogical situation in the presence of an outsider is somewhat changing than in the usual conditions without an observer. Observed phenomena, processes will be somewhat distorted, and elements of subjectivism will take place in the results of the study.

Hidden observation has certain advantages in terms of a scientific approach to the study of phenomena and processes, because examiners are not constrained by the awareness of control, and the study gives a more realistic picture of the process. Covert observation of the educational process (both audiative and audiovisual) is used in the practice of schools, higher education institutions, as well as in production, medicine, research in psychology, sociology and other fields.

The objectivity of the results of the phenomenon under study depends on other factors, for example, the duration of the observation. Duration of observation is divided into continuous and discrete (interrupted).

Continuous observation is carried out in the case when it is necessary to reflect the phenomenon in the completed form. At the same time, its beginning, development and completion are observed, that is, the duration of the continuous pedagogical process coincides with the duration of its observation. This type of observation is possible when the phenomenon under study is continuous and passes in relatively short periods of time.

Discrete (interrupted) observation is used not only when the object of observation is very long, but also when the pedagogical process is hidden and the observer discovers phenomena caused by a certain situation. It should be noted that in a discrete study, the observer often does not immediately determine which elements of the learned process (situation) he will observe. This observation is also called unstructured. Unstructured observations are often used also in psychology and sociology.

As the analysis of studies shows, in unstructured observation it is necessary to note the main (approximate) elements of the object of observation. This should include: examiners, environment, purpose, behavior, frequency and duration, etc.

The monographic study covers a certain number of pedagogical phenomena that are in a certain way interconnected, monitors their development, mutual relations, the nature of mutual influence, the effect on the main process under study. "A feature of the monographic study is the breadth and completeness of the coverage of any issue, a large number of interrelated phenomena."

Statistical observation is the process of collecting data on pedagogical phenomena for their quantitative and qualitative coverage.

Observations can also be characterized by the signs of influence on the studied process: controlled and uncontrolled.

Controlled observation aims to collect primary information to create a more accurate picture and test certain hypotheses of the study. Control is carried out by increasing the number of observers and comparing the results of their observations, as well as through intensification of observation – conducting it for the same object many times.

Under uncontrolled observation, real life situations are investigated, when the goal of a general description of a phenomenon or process is set, and, most importantly, the description of the atmosphere in which the observed event occurs. Here observation, as a rule, does not have a clear plan, and only its main object is predetermined. The success of uncontrolled observation is very dependent on the qualifications of the observer.

A conversation is a method of direct communication that allows you to receive information from the interlocutors that interests the teacher with the help of pre-prepared questions.

In accordance with the purpose of further cooperation between teachers and students, the following types of conversation are distinguished:

- experiment (involvement in cooperation). Involves setting up the interlocutor for the specifics of the experiment, a list of basic actions, providing instructions;
- experimental conversation (hypothesis testing). It is used in situations where each individual element of activity assumes complete content completeness of the previous one;
- interview.

Interview – a method of obtaining information through an oral survey.

In terms of formality, interviews are:

a) free – not regulated by the topic, form of conversation; a long conversation on the general program without a clear detail of the issues;

b) standardized – similar in form to a questionnaire with closed questions.

The semi-standardized interview combines the features of the previous two.

The boundaries between types of interviews are mobile and depend on the goal of the complexity of the problem and the stage of research.

A certain situation involves the use of the appropriate kind of interview. Diagnostic interview is a way of obtaining information about the properties of a person, which helps to penetrate into his inner world and understand problems. Clinical interview is a type of therapeutic conversation when it is necessary to provide psychological and pedagogical assistance. In this case, the researcher is interested not only in the immediate content of the respondent's answers (facts, views, feelings, associations, etc.), but also in his behavior (tone, gestures, movements, etc.). A focused interview is a short-term conversation, the purpose of which is to obtain information about a specific problem,

process, phenomenon, respondent’s reaction to a given action. Panel interview – multiple interviews of the same respondents on the same issues at regular intervals. Group interview is a planned conversation during which the researcher seeks to provoke discussion in the group.

Psychological and pedagogical experiment is a method that provides observation of changes in the psychological characteristics of a child in the process of pedagogical influence on him.

This method involves the following steps:

1. Stating experiment of the first order. Aimed at clarifying the characteristics and properties of the phenomenon under study. It involves the main and control groups. The main group is involved in all experimental procedures. The control group is the standard by which the developing and forming effect of the experiment is evaluated. Thanks to this, the study takes place in parallel.

2. Formative experiment. It is carried out using an experimental model of developing and forming influences on the subject of research. Combines various procedures: educational, gaming, practical, etc. Important at the same time is the analytical model of the "developing effect" of the experiment – a kind of "ideal image" of the researcher’s expectations about its results.

3. Stating experiment of the second order. At this stage, a "control" study is organized, involving the main and control groups of participants. Its purpose is to record indicators from the studied object after the end of the formative effects procedure.

By venue distinguish between laboratory and natural pedagogical experiment.

The study of products of activity is a research method by which a system of procedures aimed at collecting, systematizing, analyzing and interpreting products of human activity is used.

Combines several research and analytical procedures, which are distinguished by the peculiarity of the subject of knowledge.

These procedures include:

Analysis of personal documents (letters, photographs, diaries, autobiographies, personal files, notebooks). It provides material for

psychodiagnostics, the study of the life path of a person, his attitude to learning, the level of assimilation of knowledge, the formation of skills and abilities.

Analysis of official materials of group, collective and mass communication (records of conversations, discussions, meetings, charters, orders, announcements, orders, laws, rules, newspapers, radio, television programs, advertising). It is used to study social processes, phenomena and their outpouring on the personality, the state of educational work in the school.

Analysis of the products of activity (creative, professional, behavioral, social, self-oriented, etc.). As a method of psychological and pedagogical research is widely used in the research, applied activities of teachers and psychologists, its effectiveness depends on the ability of the researcher to find in the documents of the educational institution and the materials of the activities of pupils the main thing, characteristic, deeply analyze them, see for them the real facts and actions of teachers and students.

5.7. Research methods in Psychology

The methods of scientific research are the techniques and approaches through which scientists obtain reliable information used for the construction of scientific theories and the development of practical recommendations. Thanks to the application of methods from natural and exact sciences, psychology, starting from the second half of the last century, emerged as an independent science and began to develop actively. Before this moment, psychological knowledge was primarily obtained through self-observation (introspection), introspective reasoning, and observation of the behavior of other people. The intention to make psychology more precise and practically useful, not only describing but also explaining phenomena, was associated with the introduction of laboratory experiments and measurements.

Since the late 19th century, specialized technical devices and equipment for conducting laboratory experimental scientific research began to be created and applied in psychology. The pioneer in this field

was the scientist W. Wundt, who organized the work of the first psychological laboratory in Leipzig. These technical devices allowed researchers to conduct controlled and managed scientific experiments. Along with the mathematization and mechanization of research in psychology, traditional methods of gathering scientific information, including observation, self-observation, and surveys, have not lost their significance.

The main methods of psychological research and their variants used for collecting primary data include:

Observation:

– External observation (observation from the outside)

– Internal observation (self-observation)

– Free observation

Surveys:

– Oral surveys

– Written surveys

– Free surveys

– Standardized surveys

Tests:

– Questionnaire tests

– Task tests

– Projective tests

Experiment:

– Natural experiment

– Laboratory experiment

External observation involves collecting data about a person's psychology and behavior through direct observation of them. **Internal observation**, **or self-observation**, is used when a psychologist-researcher aims to study a phenomenon of interest as it is represented in their own consciousness.

Free observation has no predefined boundaries, program, or procedure for conducting it. It allows the observer to change the subject or object of observation and its nature during the observation as desired.

In contrast, **standardized observation** is pre-defined and clearly limited in terms of what is being observed.

Surveys involve individuals responding to a series of questions. **Oral surveys** are used when it is desirable to observe a person's behavior and reactions while they answer questions. This type of survey allows for a deeper understanding of the individual's psychology compared to written surveys.

Written surveys allow for a larger number of participants. The most common form of written survey is a questionnaire. However, a drawback is that when using a questionnaire, it is not possible to anticipate the responses of the person answering its questions and adjust them accordingly.

Free surveys are a type of oral or written survey in which the list of questions and possible answers is not predefined. This type of survey allows for flexible adjustments to the research tactics and obtaining non-standard responses.

Tests are specialized methods of psychodiagnostic examination that provide precise quantitative or qualitative characteristics of the phenomenon being studied. Tests can be used to study and compare the psychology of different people, providing differentiated and comparative assessments.

Questionnaire tests are constructed based on a carefully designed and validated set of questions that assess the psychological characteristics of the subjects.

Task tests involve evaluating a person's psychology and behavior based on their actions. In tests of this type, the subject is presented with a series of special tasks, and their performance is used to assess the presence or degree of the studied quality.

Projective tests are intended to study the psychological and behavioral characteristics of individuals that may evoke a negative reaction. These tests are based on the mechanism of projection, according to which individuals tend to attribute their own unconscious traits and especially flaws to others.

The specificity of the experiment as a method of psychological research lies in the deliberate and thoughtful creation of an artificial situation in which the studied property can be best studied, identified, and assessed. The main advantage of the experiment is that it allows for more reliable conclusions about cause-and-effect relationships between the phenomenon under study and other phenomena, as well as a scientific explanation of the origin and development of the phenomenon.

A natural experiment is organized and conducted in ordinary life conditions, where the experimenter practically does not interfere with the unfolding events but records them as they naturally occur. **A laboratory experiment** involves creating an artificial situation in which the studied property can be best studied.

These methods collectively contribute to the advancement of psychological science and the understanding of human behavior and cognition.

Questions:

1. What is the main function of observation in pedagogical research?

The main function of observation in pedagogical research is to find and identify facts in accordance with the goals and tasks of the study, and it is directly aimed at the continuous connection of the observer with the object of study.

2. What are the two main positions of the researcher in the context of observation in pedagogical research?

The two main positions of the researcher in pedagogical observation are: 1) researcher as a neutral observer, and 2) researcher as the head of educational and educational actions.

3. What is the difference between controlled and uncontrolled observation, and when are they typically used in research?

Controlled observation aims to collect primary information for a more accurate picture and hypothesis testing, often involving multiple observers and comparing results. Uncontrolled observation, on the other

hand, involves investigating real-life situations for general description and studying the atmosphere of observed events without a clear plan. The choice between them depends on the research goals and the complexity of the problem.

4. Who is credited with establishing the first psychological laboratory, and where was it located?

Since the late 19th century, specialized technical devices and equipment for conducting laboratory experimental scientific research began to be created and applied in psychology. The pioneer in this field was the scientist W. Wundt, who organized the work of the first psychological laboratory in Leipzig.

5. What is the difference between external observation and internal observation in psychological research?

External observation involves collecting data about a person's psychology and behavior through direct observation of them. **Internal observation**, **or self-observation**, is used when a psychologist-researcher aims to study a phenomenon of interest as it is represented in their own consciousness.

6. How does a laboratory experiment differ from a natural experiment in psychological research?

A natural experiment is organized and conducted in ordinary life conditions, where the experimenter practically does not interfere with the unfolding events but records them as they naturally occur. **A laboratory experiment** involves creating an artificial situation in which the studied property can be best studied.

SEMINAR 6
SCIENTIFIC SPEECH, CULTURE OF COMMUNICATION

6.1. Scientific language as a communicative phenomenon

Science, as a social and intellectual endeavor, relies heavily on effective communication to share knowledge, build upon existing research, and advance understanding of the natural world. Scientific language, with its unique characteristics and functions, plays a crucial role in this communication process.

Distinctive Features of Scientific Language

Scientific language is characterized by several distinctive features that set it apart from everyday language:

1. Precision and Objectivity: Scientific language strives to convey information in a precise and objective manner, minimizing ambiguity and subjective interpretations. This precision is achieved through the use of technical terms, carefully defined concepts, and consistent terminology.
2. Clarity and Explicitness: Scientific language aims to be clear and explicit, conveying ideas and results in a straightforward manner. This clarity is achieved through the use of concise sentences, logical structure, and avoidance of jargon or colloquialisms.
3. Accuracy and Verifiability: Scientific language emphasizes accuracy and verifiability, ensuring that the information can be replicated and validated by other scientists. This accuracy is achieved through rigorous data collection, systematic analysis, and transparent reporting.
4. Formality and Impersonality: Scientific language maintains a formal and impersonal tone, avoiding personal opinions or emotional expressions. This formality helps to maintain objectivity and focus on the scientific content.
5. Evolution and Adaptability: Scientific language is dynamic and evolving, adapting to new discoveries, emerging concepts, and the changing demands of scientific communication. This adaptability allows science to progress and communicate effectively across diverse fields.

Functional Roles of Scientific Language

Scientific language serves a variety of important functions in the scientific community:

1. Knowledge Sharing: Scientific language facilitates the sharing of knowledge and ideas among scientists, enabling collaboration and the advancement of scientific research.
2. Dissemination of Findings: Scientific language is used to communicate research findings to the broader scientific community, allowing for peer review, evaluation, and integration into the body of scientific knowledge.
3. Preservation and Archiving: Scientific language is used to preserve and archive scientific knowledge, ensuring that research findings and methodologies are accessible for future generations of scientists.
4. Education and Training: Scientific language is used in scientific education and training, providing students with the tools and vocabulary to understand and contribute to scientific discourse.
5. Public Communication: Scientific language is increasingly used to communicate scientific findings and concepts to the general public, promoting scientific literacy and engagement.

Impact of Scientific Language on Society

Scientific language has a profound impact on society, influencing not only the scientific community but also the broader public:

1. Shaping Scientific Thought: Scientific language shapes the way scientists think about and approach scientific problems, influencing research methodologies, interpretations, and theoretical frameworks.
2. Informing Public Understanding: Scientific language plays a crucial role in informing public understanding of science and technology, shaping public perceptions and decision-making.
3. Driving Innovation and Development: Scientific language is essential for innovation and development across various industries, enabling technological advancements and societal progress.

4. Promoting Global Collaboration: Scientific language facilitates international collaboration and exchange of knowledge, fostering global cooperation in addressing shared challenges.

5. Bridging Science and Society: Scientific language serves as a bridge between the scientific community and society at large, promoting scientific literacy, critical thinking, and informed public discourse.

Questions:

1. Name two distinctive features of scientific language.

Two distinctive features of scientific language are

Precision and Objectivity: Scientific language strives to convey information in a precise and objective manner, minimizing ambiguity and subjective interpretations. This precision is achieved through the use of technical terms, carefully defined concepts, and consistent terminology.

Clarity and Explicitness: Scientific language aims to be clear and explicit, conveying ideas and results in a straightforward manner. This clarity is achieved through the use of concise sentences, logical structure, and avoidance of jargon or colloquialisms.

2. Name functional roles of scientific language.

Functional roles of scientific language are

Knowledge Sharing: Scientific language facilitates the sharing of knowledge and ideas among scientists, enabling collaboration and the advancement of scientific research.

Dissemination of Findings: Scientific language is used to communicate research findings to the broader scientific community, allowing for peer review, evaluation, and integration into the body of scientific knowledge.

3. Name two impacts of scientific language on society.

Two impacts of scientific language on society are

Shaping Scientific Thought: Scientific language shapes the way scientists think about and approach scientific problems, influencing research methodologies, interpretations, and theoretical frameworks.

Informing Public Understanding: Scientific language plays a crucial role in informing public understanding of science and technology, shaping public perceptions and decision-making.

6.2. Culture of scientific communication

The culture of scientific communication refers to the norms, practices, and conventions that govern how scientists share and disseminate their research findings within the scientific community and to the broader public. Effective scientific communication is crucial for the progress of science, as it allows researchers to share their discoveries, ideas, and methodologies, facilitating collaboration, critique, and further advancements. Here are some key aspects of the culture of scientific communication:

Peer-Review Process:

● Publication in Journals: Scientists typically share their research findings by publishing articles in scientific journals. The peer-review process is a fundamental aspect of this, involving the evaluation of a manuscript by experts in the field before it is accepted for publication.

Conferences and Symposia:

● Sharing Research at Meetings: Scientific conferences and symposia provide a platform for researchers to present their work, discuss findings, and network with other professionals in their field. These events facilitate the exchange of ideas and foster collaboration.

Collaboration:

● Team Science: Many scientific endeavors involve collaboration among researchers with diverse expertise. Effective communication within research teams is essential for successful collaboration and for producing high-quality research.

Open Access and Open Science:

● Accessible Information: There is a growing movement towards open access publishing, making scientific research freely accessible to the public. Open science practices also involve sharing research data, methods, and materials to enhance transparency and reproducibility.

Preprints:

● Early Sharing: Researchers are increasingly using preprint servers to share early versions of their research papers before formal peer review. This allows for rapid dissemination of findings and invites feedback from the scientific community.

Science Communication for the Public:

● Public Engagement: Scientists are encouraged to communicate their research to the general public. This involves translating complex scientific concepts into understandable language, participating in outreach activities, and engaging with the media to enhance public understanding of science.

Digital Tools and Platforms:

● Online Communication: The use of digital tools, such as social media, blogs, and online forums, has become prevalent for scientists to share their work, discuss ideas, and connect with a broader audience.

Citations and Impact:

● Recognition: The number of citations a scientific paper receives is often used as a measure of its impact. Researchers strive to contribute meaningful work that advances the field and is recognized by their peers.

Ethical Considerations:

● Integrity and Trust: Scientific communication relies on the principles of honesty, integrity, and transparency. Researchers are expected to adhere to ethical standards in reporting their findings.

Multidisciplinarity:

● Interdisciplinary Communication: As science becomes increasingly interdisciplinary, effective communication between researchers from different disciplines is crucial for addressing complex challenges that require diverse perspectives.

The culture of scientific communication is dynamic and evolves with advancements in technology, changes in societal expectations, and ongoing efforts to improve the rigor and reproducibility of scientific research.

Questions:

1. What does the culture of scientific communication refer to?

The culture of scientific communication refers to the norms, practices, and conventions that govern how scientists share and disseminate their research findings within the scientific community and to the broader public.

2. Name the key aspects.

Peer-Review process, conferences and symposia, collaboration, open access and open science, preprints, science communication for the public, digital tools and platforms, citations and impact, ethical considerations, multidisciplinarity.

The culture of scientific communication is dynamic and evolves with advancements in technology, changes in societal expectations, and ongoing efforts to improve the rigor and reproducibility of scientific research.

3. What is the culture of scientific?

The culture of scientific communication is dynamic and evolves with advancements in technology, changes in societal expectations, and ongoing efforts to improve the rigor and reproducibility of scientific research.

6.3. Structural features of a scientific text

Each researcher tries to convey his thoughts to the reader in the most clear and understandable way. One believes that for this it is enough to briefly describe the course of the research and describe the final results in detail. The other one seems to introduce the reader to his creative laboratory, leisurely leading him from stage to stage, revealing in detail and consistently the methods of his work, its successes and failures, the entire course of the research process. Thus, the reader is presented with the entire difficult path of searching for a scientist from the creative idea to the final stage of the work – summing up, formulating conclusions and proposals.

The first version of the presentation is often used by authors of scientific monographs designed for a relatively narrow circle of specialists. For any research, the second version of the presentation is more acceptable, which makes it possible to better reveal the applicant's ability to conduct independent research work. This contributes to the fuller detection of the depth of his scientific erudition in this field of science and special knowledge on work issues.

In the arsenal of the authors of scientific works, there are several methodological techniques for the presentation of scientific materials. The following methods are most often used: 1) sequential, 2) integral (with subsequent processing of each section), 3) selective (sections are written separately in any sequence).

A sequential presentation of the material of a scientific work requires more time, because the author cannot move on to the next chapter without finishing the work on the previous one. And to process one section, it is sometimes necessary to check several options in order to find the best one of them. At the same time, the material, which hardly needs rough processing, waits for its turn and lies motionless.

Holistic reception. Here, it will take almost half as much time to prepare the final version of the manuscript, because first a draft of the entire work is written, as if with rough strokes, then it is processed in parts and details.

A selective presentation of materials is also often used by researchers. As the facts become available, the author processes the materials in any order convenient for him, just as an artist paints a picture not necessarily from the top or bottom. Therefore, you can choose exactly the method of exposition that seems most appropriate for transforming the so-called draft manuscript into an intermediate or final one.

Questions:

1. What are the differences between the two approaches in presenting scientific research according to the text?

One approach involves briefly describing the research and detailing the final results, often used in scientific monographs for a specific specialist audience. The other approach involves a thorough, detailed presentation, leading the reader through the entire research process, including methods, successes, failures, and the journey from the initial idea to conclusions. This latter approach showcases the researcher's ability to conduct independent work.

2. What are the primary methodological techniques used by authors to present scientific materials?

The most common methods are: 1) sequential presentation, where each section is completed before moving to the next; 2) integral presentation, involving drafting the entire work before detailed processing section by section; and 3) selective presentation, where materials are processed in any convenient order as they become available, similar to an artist painting a picture without a set top-to-bottom approach.

3. What are the advantages and challenges associated with the sequential, integral, and selective methods of presenting scientific materials?

The sequential method ensures completeness but might prolong the process due to the need for thorough processing before moving forward. The integral approach involves drafting the entire work before detailed processing, taking nearly half the time. The selective method offers flexibility but may lack a systematic flow, allowing researchers to process materials as they become available in any preferred order.

6.4. Language and style of scientific work

Since the thesis is primarily a qualifying work, special attention should be paid to its language and style. The linguistic and stylistic culture of a scientific work, after all, best reflects the overall culture of the author.

The language and style of the work, as part of written scientific language, have evolved under the influence of what is known as academic etiquette, the essence of which is the interpretation of one's own and

borrowed points of view to justify scientific truth. Certain traditions have already been established in the communication of scholars, both in oral and written language. However, it should not be assumed that there exists a compilation of "written" rules of scientific language. One can only speak of some established features.

The most characteristic feature of written scientific language is the formal-logical method of presenting material. This is reflected in the entire system of linguistic means. Scientific exposition consists primarily of reflections whose purpose is to prove the truths discovered through the investigation of facts of reality.

For scientific text, semantic completeness, integrity, and coherence are characteristic. The most important means of expressing logical connections here are special functional-syntactic means of connection, indicating the sequence of thought development (first, foremost, then, firstly, secondly, therefore, etc.), negation (however, meanwhile, but, while, nevertheless, in no way), cause-and-effect relationships (thus, therefore, thanks to this, accordingly, as a result, besides, moreover), transition from one thought to another (before moving on to..., let’s turn to..., consider, focus on..., having considered..., let’s move on to..., it is necessary to stop at..., it is necessary to consider...), result, conclusion (therefore, means, as a conclusion, in conclusion, all that has been said allows us to draw a conclusion, summarizing, it should be said...).

Pronouns, adjectives, and participles (this, that, such, named, indicated, etc.) can serve as means of logical connection.

Not always do these and similar words embellish scientific work, but they serve as peculiar signposts that warn of the author’s shifts in thought and inform about the nuances of their creative path. The reader of a scientific work immediately understands that words like "indeed" or "truly" indicate that the following text should be a proof. On the other hand, expressions like "on the other hand," "contrarily," or "but" prepare the reader for the perception of opposition, while "because" provides an explanation.

In some cases, phrases of the type mentioned above not only help delineate transitions in the author’s thinking but also contribute to

improving the text’s categorization. For instance, phrases like "let’s move on to the discussion of" can replace a section heading. Serving as implicit subheadings, they clarify the internal sequence of presentation, making them essential in scientific texts.

At the level of the entire text, purposefulness and pragmatism are probably the main characteristics of scientific language. Hence, it becomes clear why emotional language elements play a minor role in scientific works. Scientific texts are characterized by the inclusion of precise information and facts obtained through prolonged observations and scientific experiments. This accounts for both the precision in their verbal expression and the use of specialized terminology.

Specialized terms enable the concise and economical provision of detailed definitions and characteristics of scientific facts, concepts, processes, and phenomena.

It is crucial to remember that a scientific term is not just a word; it embodies the essence of a particular phenomenon. Therefore, the selection of scientific terms and definitions must be done with great care. Different terminologies should not be arbitrarily mixed in one text, considering that each scientific field has its own terminological system.

Professional lexicon, or words and expressions common in a specific scientific environment, is also not used instead of accepted terms in a given science. Professional terms do not denote scientific concepts; instead, they are conditional and highly differentiated designations of realities used among narrow specialists and understood only by them. It is their unique jargon. The foundation of such jargon is a colloquial understanding of a scientific concept.

The phraseology of scientific prose is also highly specific. On one hand, it is intended to define logical connections between parts of statements (such as stable combinations like "present the results," "as the analysis showed," "based on the obtained data," "summarizing what has been said," "hence it follows that," and so on). On the other hand, it aims to denote certain concepts, essentially serving as terms (examples include "high-voltage current," "constitutional law," "free economic zone," and so on).

Questions:

1. What are some key characteristics of written scientific language according to the text?

The characteristics include a formal-logical method of presentation, semantic completeness, coherence, and the use of special functional-syntactic means to indicate logical connections. Pronouns, adjectives, and participles also serve as means of logical connection.

2. Why do emotional language elements play a minor role in scientific works?

Emotional language elements are minimized in scientific works because the focus is on purposefulness, pragmatism, and the inclusion of precise information and facts obtained through observations and experiments. This precision necessitates the use of specialized terminology, which aims for clarity and accuracy rather than emotional expression.

3. What distinguishes professional lexicon from scientific terms in written scientific language?

Professional lexicon, specific to certain scientific environments, does not replace accepted scientific terms. Scientific terms encapsulate the essence of particular phenomena and are used universally within a field. Professional terms, on the other hand, are specialized jargon understood only by narrow specialists, based on colloquial understandings of scientific concepts.

SEMINAR 7
CITATIONS, REFERENCES, BIBLIOGRAPHIC SEARCH

7.1. Study of literary sources

In the process of preparing and conducting any research, five main stages can be distinguished:

– stage of accumulation of scientific information: bibliographic search of scientific information, study of documents, main sources of the topic, compilation of literature review, selection of research aspects;

– formulation of the topic, goal and task of the research, definition of the problem, justification of the object and subject, goal, main tasks, hypothesis of the research;

– theoretical research – justification of directions, choice of general methodology, methods, development of concept, parameters, formulation of research conclusions;

– conducting an experiment – developing a program, methodology, obtaining and analyzing data, formulating conclusions and research results;

– preparation of the results of scientific research, conclusions, recommendations, clarification of scientific novelty and practical significance. As you can see, the research begins with the analysis of information materials on the chosen topic.

Information is divided into:

– review (secondary) – review of scientific materials;

– relational, contained in descriptions of prototypes of scientific tasks;

– abstract (secondary) – contained in abstracts, summaries, abstracts;

– signal (secondary) – information of the previous message;

– reference (secondary) – systematized short information in any field of knowledge.

So, when processing information, it can be divided into two groups.

Primary information is the original information that is the result of direct sociological experimental research, the study of practical experience

(this is actual data collected by the researcher, their analysis and verification).

Secondary information is the result of analytical processing and publication of information on the topic of research (these are published documents, an overview of information on the topic). It is:

– information publications (signal information, reference magazines, express information, reviews);

– reference literature (encyclopedias, dictionaries);

– catalogs and filing cabinets;

– bibliographic editions

This information serves as a theoretical and experimental basis, the basis of conducting scientific research, and is proof of the scientific validity of its work, its reliability and novelty.

Validity is sufficient correctness, proof that the named result (law, set of facts) is true, correct. The reliability of the results and conclusions is substantiated by an experiment, a logical proof, an analysis of literary and archival sources verified in practice. There are three groups of methods of proving reliability: analytical, experimental, and confirmation of practice.

The most important methods of scientific knowledge include analytical methods. Their essence is proof of the result through logical, mathematical transformations, analysis of statistical data, published and unpublished documents (accounting, planning, analytical, questionnaire).

Knowledge of published information makes it possible to deepen the scientific and practical material of other scientists and researchers, to reveal the level of research on a specific topic, to prepare a review of the literature on the topic. The researcher obtains the necessary scientific information in libraries and bodies of scientific and technical information.

To process sources on the chosen topic, one uses the library's information and search engine.

The libraries use the library-bibliographic information search language (ISL): universal decimal classification (UDK) and library-bibliographic classification (VBK).

UDC systematizes all human knowledge in 10 chapters, where each chapter has ten subsections

Sphere identification number	Sphere naming
0	General
1	Philosophy, psycology
2	Religion
3	Social sciences, tourism economy
4	Phislosophy, linguistics
5	Mathematics, natural sciences
6	Applied knowledge
7	Art, applied art
8	Literary studies, fiction
9	Geography, history

This UDC classification has been used as a universal litrature organisation guide, yet some modern types of classification have appeared recently (alphabetic, LBC (library-bibliographic, WEB)

Questions:

1. How many types of information are there in literature research field?

Types of Information in Literature Research: in the field of literature research, information can be broadly categorized into primary, secondary, and tertiary sources.

Primary Sources: Original materials or data directly associated with a topic or event. Examples include diaries, interviews, research studies, and original literary works.

Secondary Sources: Interpretations or analyses of primary sources. They discuss, analyze, or summarize information derived from primary sources. Examples include review articles, textbooks, or critical analyses of literary works.

Tertiary Sources: Compilations or summaries based on primary and secondary sources. These include encyclopedias, dictionaries, or handbooks that provide an overview or consolidation of information.

2. What are the stages of preparing for creating a scientific rsearch?

The stages of preparing for scientific research typically involve:

Identifying Research Topic: Defining the research area, problem statement, and objectives.

Literature Review: Conducting a thorough review of existing literature to understand prior research and identify gaps.

Formulating Hypothesis/Objectives: Developing a clear hypothesis or research questions.

Designing Methodology: Determining the research design, methods, and data collection techniques.

Data Collection: Collecting relevant data or conducting experiments as per the research methodology.

Data Analysis: Analyzing the collected data to derive meaningful conclusions.

Interpretation and Conclusion: Interpreting results and drawing conclusions aligned with research objectives.

Documentation and Reporting: Documenting the entire research process and preparing a report or paper for publication.

3. Name a few ways of organising information in libraries or databases.

Classification Systems: Using categorization systems like Dewey Decimal Classification (for books) or Library of Congress Classification to organize physical materials.

Database Indexing: Employing indexing techniques such as keywords, subject headings, or metadata to categorize and retrieve digital information.

Cataloging: Creating catalogs or databases that provide information about available resources, including titles, authors, subjects, and publication details.

Information Retrieval Systems: Using search engines or databases with various filters and search criteria to facilitate efficient information retrieval.

Digital Libraries: Structuring information within digital repositories, often with search capabilities and categorization methods for ease of access.

7.2. General rules of citation and references to used sources

Citation and referencing follow specific guidelines to credit and acknowledge sources used in academic work. Here are some general rules:

In-text Citations: When referencing within the text, include the author’s last name and the year of publication. For example: (Author’s Last Name, Year).

Direct Quotations: When directly quoting, include the page number along with the author’s name and year: (Author’s Last Name, Year, p. Page Number).

Reference List/Bibliography: Include a detailed list of all sources cited in the work at the end under "References" or "Bibliography," organized alphabetically by the author’s last name.

Format of References: The format varies (APA, MLA, Chicago, etc.). Each format has specific guidelines for structuring references (books, journal articles, websites, etc.) with details such as author name, publication year, title, publisher, etc.

Consistency: Maintain consistency in citation style throughout the document, following the prescribed formatting and punctuation rules.

Avoid Plagiarism: Proper citation and referencing prevent plagiarism by giving credit to the original authors and sources.

Online Sources: Include the URL or DOI for online sources, ensuring accuracy and retrieval.

Multiple Authors: When a source has multiple authors, cite them for in-text citations. In the reference list, list all authors following the prescribed format.

Personal Communications: For personal communications (interviews, emails), cite them within the text but not in the reference list.

Unpublished Sources: If referring to unpublished work, include as much information as possible (author, year, title, description).

Remember to consult the specific style guide (APA, MLA, Chicago, etc.) recommended by your institution or publisher for precise formatting rules. Each style guide provides comprehensive guidelines on citation and referencing, ensuring accuracy and consistency in academic writing.

Questions:

1. Why is it important to maintain consistency in citation style throughout an academic document?

Consistency in citation style ensures uniformity and clarity, allowing readers to easily locate and verify the sources referenced in the document. It also demonstrates academic integrity by following established standards.

2. How does proper citation contribute to avoiding plagiarism in academic writing?

Proper citation gives credit to the original authors or sources of information used in the document. By acknowledging these sources, it demonstrates respect for intellectual property and prevents unintentional plagiarism by clearly distinguishing between the writer’s ideas and borrowed information.

3. What role do style guides (APA, MLA, Chicago, etc.) play in academic writing and referencing?

Style guides provide specific formatting and citation rules for different types of sources (books, articles, websites, etc.) to maintain consistency and accuracy in academic writing. They offer guidelines on how to structure references, cite sources in-text, and format bibliographies, ensuring conformity with established standards.

7.3. Methods of selecting factual materials and compiling a literature review

Selecting factual materials and compiling a literature review involves several key methods:

Defining Search Parameters: Clearly define the scope and objectives of your literature review. Determine the specific research question or topic you aim to address to narrow down the focus of your search.

Utilizing Academic Databases: Access scholarly databases like PubMed, JSTOR, Google Scholar, or specific databases related to your field. Use keywords, Boolean operators, and filters to refine your search and access relevant articles, books, journals, and other academic sources.

Systematic Search Strategies: Employ systematic search strategies such as Boolean operators (AND, OR, NOT) to combine keywords effectively. Use truncation (*) and quotation marks for precise searches. Also, consider searching by author names, publication dates, or specific journals.

Reviewing Citations and References: Examine the reference lists of articles and books relevant to your topic. This strategy, known as citation chaining, helps discover additional sources related to your research area.

Consulting Bibliographies: Refer to the bibliographies of key texts or review articles related to your topic. These can lead you to seminal works and foundational literature in your field.

Citing Key Authors and Journals: Identify prominent authors, scholars, or journals in your field. Their contributions often provide a

foundation for understanding a particular area and can guide your search for more recent or related research.

Tracking Recent Publications: Set up alerts or RSS feeds for newly published articles or papers in your area of interest. This ensures you stay updated on the latest developments in your field.

Evaluating and Organizing Materials: Critically evaluate the relevance, reliability, and quality of the gathered materials. Organize these materials based on themes, methodologies, or key findings to facilitate the synthesis of information in your literature review.

By employing these methods, researchers can effectively gather factual materials and compile a comprehensive literature review that informs their research, providing a thorough understanding of the existing knowledge and the current state of the field.

Questions:

1. Why is defining search parameters crucial in literature reviews?

Clear definitions help narrow down the focus and objectives of the review. By establishing specific research questions or topics, researchers can direct their efforts towards relevant materials, preventing information overload.

2. How do citation chaining and bibliographies aid in literature review compilation?

Citation chaining involves reviewing reference lists in existing articles, helping researchers discover additional sources connected to their research area. Consulting bibliographies of key texts or reviews leads to foundational literature, guiding researchers to seminal works in the field.

3. Why is it important to evaluate and organize gathered materials in a literature review?

Evaluation ensures the reliability and relevance of materials, contributing to the credibility of the review. Organizing these materials

based on themes, methodologies, or key findings aids in synthesizing information, facilitating a structured and coherent literature review.

7.4. Methods of presentation of scientific materials

The author of a scientific work must remember: what he understood in the process of research is still unknown to potential readers. Concentration of attention on the new, clear explanation of difficult points, use of analogies with known phenomena and facts will be the key to attracting readers' attention to the main provisions of the work. When making a plan, presenting the text, it is desirable to provide that readers are given the opportunity to independently follow the entire sequence of the research. But that is not the main thing either. It is important that the course of the author's reasoning is always in the reader's field of vision. Therefore, each researcher tries to convey his thoughts to the reader in the most clear and understandable way, in his opinion. One believes that for this it is enough to briefly describe the course of the research and describe the final results in detail. The other seems to introduce the reader to his creative laboratory, leisurely leading him from stage to stage, revealing in detail and consistently the methods of his work, its successes and failures, the entire course of the research process. Thus, the reader is presented with the entire difficult path of searching for a scientist, from the creative idea to the final stage of the work – summarizing, formulating conclusions and proposals.

The first version of the presentation is often used by authors of scientific monographs designed for a relatively narrow circle of specialists. For any dissertation, the second version of the presentation is more acceptable, which makes it possible to better reveal the applicant's ability to conduct independent research work. This contributes to the fuller detection of the depth of his scientific erudition in this field of science and special knowledge on the issues of the dissertation, that is, the compliance of its author with the official requirements for holders of scientific degrees.

In the arsenal of authors of scientific works (first of all, scientific monographs, dissertations) there are several methodical methods of presentation of scientific materials. The following methods are most often used: 1) sequential, 2) integral (with subsequent processing of each section), 3) selective (sections are written separately in any sequence).

A sequential presentation of the material requires more time, because the author cannot move on to the next chapter without finishing the work on the previous one. And to process one section, it is sometimes necessary to check several options in order to find the best one of them. At the same time, the material, which hardly needs rough processing, waits for its turn and lies motionless

Holistic reception. Here, it will take almost half as much time to prepare the final version of the manuscript, because first a draft of the entire work is written, as if with rough strokes, then it is processed in parts and details.

A selective presentation of materials is also often used by scientists. As the actual data becomes available, the author processes the materials in any convenient order for him, just as an artist paints a picture not necessarily from the top or bottom. Therefore, you can choose exactly the method of exposition that seems most appropriate for transforming the so-called draft manuscript into an intermediate or final one.

At this stage of work on the manuscript from the already accumulated text material, in addition to the main sections, it is advisable to highlight the following compositional elements of the work: a) introduction, b) conclusions and proposals, c) bibliographic list of used literary sources, d) appendices, e) indexes.

Before proceeding to the final processing of the draft manuscript, it is useful to discuss the main provisions of its content with the scientific supervisor.

Work on the final versions of the manuscript. When the layout of the draft manuscript is ready, all the necessary materials are collected, the necessary generalizations are made, the detailed polishing of the manuscript text begins. Every conclusion, formula, table, every sentence, every word is checked and critically evaluated.

The researcher once again checks to what extent the title of his work and the names of sections and subsections correspond to their content, specifies the composition of the dissertation work, the placement of materials and their classification. It is also appropriate to once again check the persuasiveness of the arguments in defense of one's scientific positions. Here you have to look at your own work as if with "other people's eyes", critically and demandingly.

Questions:

1. What's the significance of the two contrasting approaches to presenting scientific work, especially in the context of dissertations and monographs?

The first approach focuses on succinctly summarizing research and detailing final results, suitable for specialized monographs. Conversely, the second approach methodically leads readers through the entire research process, demonstrating methods, successes, and failures, often preferred for dissertations to showcase independent research abilities.

2. How do different presentation methods (sequential, integral, selective) impact the preparation time for a scientific manuscript?

Sequential presentation demands more time as each section needs completion before moving forward. The holistic method involves drafting the entire work before detailed refinement, taking about half the time. Selective presentation, often used as data becomes available, offers flexibility in processing materials based on convenience.

3. What are the key compositional elements advisable to highlight during manuscript preparation, and why are they important?

Essential compositional elements include the introduction, conclusions/proposals, bibliographic sources, appendices, and indexes. These elements provide a comprehensive framework for readers to navigate and understand the research context, findings, and reference materials effectively.

SEMINAR 8
DESIGNING THE RESULTS OF SCIENTIFIC RESEARCH

8.1. Rules for the design of scientific paper

"This section of the work presents the most important scientific and practical results obtained during independent research that contributed to solving the scientific problem (task). The conclusions should emphasize the quantitative indicators of the obtained results and justify their credibility. Furthermore, recommendations for the scientific and practical utilization of the obtained results are formulated.

It is recommended that the conclusions be numbered and their quantity not be less than the number of tasks set in the work. The conclusions should contain sentences indicating the scientific novelty and practical value of the obtained results. Additional statements such as 'Proven that...' or 'First discovered that...' may be included.

The volume of the conclusions should not exceed 4–6 pages. The research result becomes the culmination of the scientific work and, in a sense, its conclusion. The scientific work and research don't necessarily have to be the result of the same person's activity (author). Authors can use the results of other researchers, depending on the status of the scientific work."

Questions:

1. **What are the key aspects highlighted in formulating conclusions in academic research according to the provided guidelines?**

- The guidelines stress the importance of presenting significant scientific and practical outcomes, emphasizing quantitative indicators, and justifying the credibility of these results.

2. **How does the text differentiate between various academic works concerning the requirement for novelty and personal contribution of results?**

- It distinguishes that while coursework or diploma works might not necessitate entirely novel findings, for dissertations, personal contribution and originality of results are obligatory for degree attainment.

3. Why is it suggested that authors of dissertations explicitly highlight their personal contributions to the research, according to these guidelines?

- The guidelines emphasize the necessity for authors pursuing higher academic degrees to distinctly present their personal contributions, as these contributions become a crucial factor in evaluating their eligibility for those degrees.

8.2. Structure of scientific paper

Successful completion of scientific work significantly depends on the technique of presenting the research results in writing. Therefore, before directly writing the work, the author should carefully plan the content, structure the material, and become familiar with the requirements for the content and technical presentation of scientific works in the Ukrainian language.

A thesis should include:

- Title page
- Table of contents
- Abstract (only for master's theses)
- List of symbols or abbreviations (if present)
- Introduction
- Main part (which includes 2–3 chapters with subsections)
- Conclusions
- List of references
- Summary (in our case, in the languages the student studies; for coursework – the main foreign language, for a thesis – two foreign languages, for a master's thesis – the main foreign language)
- Appendices (if present)

Title Page The title page of a scientific work contains the name of the ministry (1st line), the name of the scientific organization or higher educational institution (2nd line), the department where the work was carried out, the full title of the thesis, the student's surname, first name, patronymic, specifying the faculty where they study, the field of study, academic degree, academic title, supervisor's name and initials, permission for defense, city, and year.

Table of Contents The table of contents is presented at the beginning of the work. It lists the titles and page numbers of all sections, subsections, and points (if they have titles), including the introduction, conclusions, bibliography, summary, appendices, etc.

List of symbols, abbreviations, characters, and terms (if present) If specific terminology is used in the work, along with unfamiliar abbreviations, new symbols, and notations, a list may be provided before the introduction. The list should be presented in two columns, with abbreviations alphabetically listed on the left and their detailed decryption on the right.

The coursework volume is 25–30 pages, the thesis should not exceed 50–60 pages excluding appendices, and the master's thesis – 80–100 pages. The scientific work should be printed on one side of an A4 sheet.

Heading structure of the thesis: CONTENTS, LIST OF ABBREVIATIONS, INTRODUCTION, CHAPTER, CONCLUSIONS, LIST OF REFERENCES, SUMMARY, APPENDICES, should be printed in capital letters symmetrically to the text. Each of the indicated structural parts of the work should start on a new page.

Subheadings should be printed in lowercase (except for the first capital letter) with an indent. A period is not placed at the end of the subheading. If the title consists of two or more sentences, they are separated by a period.

Numbering should be in Arabic numerals without the sign № for pages, chapters, subsections, points, subpoints, figures, tables, etc.

The first page of the work is the title page, which is included in the general page numbering of the thesis. The title page does not have a

page number, and subsequent pages are numbered either at the top center or in the upper right corner.

Questions:

1. **What elements should be included in the structure of a scientific thesis according to the provided guidelines?**

Answer: According to the guidelines, a scientific thesis should consist of a title page, table of contents, abstract (if applicable), list of symbols or abbreviations, introduction, main part with chapters and subsections, conclusions, list of references, summary in specified languages, and appendices (if present).

2. **How should subheadings be formatted in a scientific paper based on the given instructions?**

Answer: Subheadings in a scientific paper should be printed in lowercase, except for the first letter, with an indentation. There should not be a period at the end of the subheading. If the title consists of multiple sentences, they are separated by a period.

3. **What are the formatting guidelines for page numbering and header alignment in a scientific work according to the guidelines provided?**

Answer: Page numbering in a scientific work should be in Arabic numerals without the sign №. The first page is the title page, which is included in the general page numbering. The subsequent pages are numbered either at the top center or in the upper right corner. The header alignment should be justified.

8.3. Requirements for applications and resumes

Students at the Institute of Foreign Languages provide a summary at the end of their research work in one (coursework, bachelor's, and master's theses) or two foreign languages (thesis). By preparing a summary in foreign languages, students learn to express themselves correctly regarding their research work.

A summary in two foreign languages should be identical in content and consist of two parts – introductory and summarizing.

The first part should formulate the topic of the research work, justify the relevance of the study, define its purpose, objectives, object, subject, and methods. In the second part, it is necessary to concisely formulate the conclusions made by the author of the research work, as well as indicate the practical and theoretical value of the research.

Questions:

1. What is the requirement for providing a summary in two foreign languages at the Institute of Foreign Languages for research work?

Answer: At the Institute of Foreign Languages, a summary in two foreign languages must be identical in content and consist of two parts – an introductory section where the research topic, relevance, purpose, objectives, object, subject, and methods are defined, and a summarizing section that concisely presents the conclusions and the practical and theoretical value of the research.

2. What skill do students develop by preparing summaries in foreign languages according to the institute's guidelines?

Answer: By preparing summaries in foreign languages, students at the Institute of Foreign Languages develop the skill of expressing themselves accurately and appropriately regarding their research work.

3. What are the two main sections that should be included in a summary written in two foreign languages for research work according to the guidelines?

Answer: The summary in two foreign languages should consist of an introductory section, where the research topic, relevance, objectives, and methods are defined, and a summarizing section that outlines the conclusions and the practical/theoretical value of the research.

RECOMMENDED SOURCES OF INFORMATION

a) main:

1. Злепко С.М., Тимчик І.С., Тимчик С.В. Інтелектуальна власність в науково-технічній діяльності : навчально-методичний посібник. Вінниця : ВНТУ, 2010. 130 с.

2. Лопушанський В.М., Бродська О.О. Основи наукових досліджень : навчальний посібник. Дрогобич : Видавничий відділ ДДПУ імені Івана Франка, 2014. 154 с.

3. Мороз І.В. Кваліфікаційні роботи у педагогічному вузі. Методика написання, правила оформлення і порядок захисту : практичний посібник для студентів. Київ : Вид-во Національного педагогічного університету ім. М. Драгоманова, 2002. 110 с.

4. Сидоренко В.К., Дмитренко П.В. Основи наукових досліджень : навчальний посібник для вищих педагогічних закладів освіти. Київ : РННЦ «ДІНІТ», 2000. 259 с.

5. Філіпенко А.С. Основи наукових досліджень : конспект лекцій : посібник для вузів. Київ : Академвидав, 2004. 208 с.

6. Шейко В.М., Кушнаренко Я.М. Організація та методика науково-дослідницької діяльності : підручник. 5-те вид., стер. Київ : Знання, 2006. 307 с.

b) additional:

1. Державний стандарт України. Документація. Звіти в сфері науки і техніки. Структура і правила оформлення. ДСТУ 3008-95.

2. Єдина система конструкторської документації. Позначення умовні, графічні в схемах. Елементи цифрової техніки ДСТУ 2.743-82.

3. Gruber T.R. Toward Principles for the Design of Ontologies Used for Knowledge Sharing. *Technical Report KSL 93-04*. Knowledge Systems Laboratory, Stanford University, 1993.

4. Gruber T. Ontology. *Encyclopedia of Database Systems* / Ling Liu and M. Tamer Özsu (Eds.). Springer Verlag, 2008.

c) Internet resources:

1. https://dspu.edu.ua/iim/wp-content/uploads/sites/8/2023/06/osnovi-naukovix-doslidzhen_zagalna.pdf
2. https://uk.wikipedia.org/wiki/Кодекс_академічної_честі
3. https://uk.wikipedia.org/wiki/Інтелектуальна_власність

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