

OSINT CHRONICLE



Quarterly paper series introducing
the world of open sources

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The four-part series of papers on Open Source Intelligence (OSINT) provides a quarterly insight into the profound world of this intelligence gathering discipline. The series starts on April 8, 2024 and continues on the first Monday of each subsequent quarter. The papers are designed to shed light on different facets of OSINT in order to provide readers with an in-depth understanding of the subject matter. Each paper will therefore focus on a different key area.

The first paper will be dedicated to the basic pillars of OSINT, starting with the history, definitions and funda-

mental concepts. The second paper will focus on the necessary skills and abilities as well as holistic training approaches to excel in the discipline. The third part will cover the legal framework and ethical issues surrounding the subject. It will provide a unique insight into the challenges and uncertainties of this discipline. The final fourth paper will conclude by exploring the current technological status quo of OSINT, presenting the latest trends and analyzing the discrepancies between theory and practice.

Date		Paper-topic
08.04.2024		Historical derivation and definition of OSINT
01.07.2024		Holistic training/training approaches
02.09.2024		Legal and ethical challenges/uncertainties
07.01.2025		Technological status quo

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Comprehensive OSINT Training

Holistic Approaches for Effective and Future-Proof Education

1. Abstract

As Open Source Intelligence (OSINT) continues to gain attention and relevance, its complexity grows with rapid technological advancements. However, the availability of comprehensive educational programs has not kept pace with these developments. In this issue of the OSINT Chronicle, we address this critical gap. We examine the current state of OSINT training, identify existing challenges, and explore strategies to enhance the efficiency and effectiveness of OSINT training programs through holistic approaches.

2. Introduction

Recently, the Bureau of Intelligence and Research (INR) of the US Department of State presented a new paper outlining its „Open Source Intelligence Strategy“ for 2024 to 2026 [1]. This paper highlights the crucial importance of OSINT in our data-driven world and sets forth four strategic OSINT goals to be achieved in the next two years. These goals include increasing budgets, developing regulations for OSINT usage, and, importantly, strengthening and focusing on OSINT training. The INR aims not only to enhance the technical and methodological skills of OSINT practitioners but also to develop sustainable training programs to ensure the optimal use of OSINT overall.

The objective appears logical, given the rapid development of OSINT. Technological advances, new tools, an unprecedented volume of information, and the use of Artificial Intelligence (AI) are making the field more complex than ever. Analysts, particularly those in the regulatory sector, face significant pressure to continuously enhance their skills to keep up with these rapid developments. However, despite the considerable attention and progress OSINT is experiencing, the publication rate of scientific papers and the availability of essential educational resources are lagging this advancement [2].

This issue of the OSINT Chronicle is dedicated to addressing this pressing topic. We examine the current state of the OSINT training landscape, identify gaps, and focus on holistic and innovative solutions. The goal is to highlight ways in which the skills of OSINT analysts can be sustainably strengthened through targeted training programs.

3. From Planning to Presenting: Key Competencies Along the Intelligence Cycle

OSINT practitioners, whether in government, business, or journalism, require a wide range of skills and competencies throughout the entire Intelligence Cycle [3]. These skills extend far beyond mere tool knowledge and vary depending on the application environment and specific tasks. However, some core skills are universally relevant.

In the **planning and direction phase**, the ability to analyze requirements is of central importance. This includes understanding and formulating information needs. Project management and coordination skills are equally essential to ensure effective teamwork. OSINT practitioners must be able to define research questions, set clear goals for their intelligence product, and pursue them efficiently [4].

The **collection phase** necessitates a diverse array of technical skills, particularly proficiency in using specialized OSINT tools and databases. As applications and tools continually evolve, it is crucial for practitioners to stay updated with the latest advancements. Efficient research methods are essential for gathering data from various sources. Additionally, the growing prevalence of AI and disinformation underscores the importance of verifying information and data [5]. OSINT practitioners must also possess a solid understanding of legal and ethical considerations, ensuring they are aware of which data can be legally and ethically collected and the appropriate methods for doing so [6].

Processing and evaluation involve making large volumes of information usable. This requires filtering relevant data from the mass and converting it into an accessible form, such as databases. Technical skills in handling large datasets are essential, along with contextual knowledge to identify and prepare relevant information for analysis. Furthermore, expertise in automating these processes is increasingly significant.

The analysis and production phase involves merging, evaluating, and analyzing the processed data with the aim of creating a high-quality intelligence product. A structured approach, knowledge of relevant methods, and analytical as well as critical thinking are essential, along with subject-matter expertise related to the initial question.

When it comes to dissemination the ability to clearly and concisely prepare results for presentation in reports or briefings is key. OSINT practitioners must be adept at conveying complex information in an understandable and meaningful manner to decisionmakers [4]. In the final step, feedback, the analysts' previous work is evaluated by superiors or decision-makers. During this step, soft skills such as communication, reflection, and adaptability are particularly important for the analyst.

4. OSINT Training: Potentials and Gaps in the Current Training Landscape

The need to effectively teach the aforementioned skills and competencies is addressed by a diverse, yet sometimes incomplete, training landscape. Despite growing interest and commitment from various training providers, significant challenges still remain to be overcome [2].

4.1 Overview of the OSINT Training Landscape: Key Players and Educational Formats

The current OSINT training landscape is diverse, encompassing a wide range of actors and formats. Governments and security agencies offer specialized training courses for their employees, focusing on practical applications and the specific needs of their respective organizations. These courses typically cover various OSINT tools, legal frameworks, and operational tactics.

Universities and colleges are increasingly integrating OSINT into their curricula as well. These academic programs provide a solid theoretical foundation and promote the development of analytical skills. However, they remain relatively rare and tend to emphasize theoretical knowledge over practical skills related to the potential applications of OSINT.

A large number of private companies and individuals also offer OSINT training courses tailored for various target groups, including government agencies, businesses, journalists, and individuals. These training formats range from open seminars and e-learning modules to customized in-house training sessions, covering a wide range of topics. However, many of these offerings primarily focus on the data collection and processing phases. The critical analysis of the collected data and the subsequent decision-making processes are often covered in less detail [2].

Additionally, numerous free, openly accessible educational resources are available, mostly provided digitally by individuals. These resources typically focus on specific aspects, such as setting up or using a particular OSINT tool.

4.2 Challenges in Current OSINT Training

While the increasing availability of free and paid educational resources in OSINT is generally positive, several challenges remain. One significant issue is the mentioned predominant focus on the initial phases of the Intelligence Cycle. Additionally, there is a notable lack of standardization across the field [7].

This lack of standardization is evident in several areas. Firstly, there is a deficit in standardized curricula for teaching OSINT fundamentals that are applicable and relevant across different organizations. Secondly, structured training programs tailored to the specific needs of various organizations, tasks, and roles are often insufficient [1]. Lastly, there is a lack of applying standardized teaching and learning methods. Although various approaches such as face-to-face instruction, e-learning, group work, case studies, and practical exercises are common, their systematic use within structured training programs is hardly evident.

This lack of standardization ultimately hinders OSINT practitioners from acquiring the necessary skills for their work [8] and complicates cross-departmental cooperation, especially in official environments, due to the absence of a common understanding of fundamental principles. It also results in considerable differences in the quality of available training courses. There are few established standards or certifications in the OSINT field to ensure adherence to certain training standards.

Additionally, keeping training content up to date is a significant challenge given the rapid pace of technological advancements. New tools and methods require continuous adaptation of curricula. This challenge is expected to be further exacerbated by the swift development of AI and Machine Learning (ML).

In conclusion, there is often a significant gap between theoretical knowledge and the practical application of OSINT. While some training courses focus on demonstrating and practicing the use of specific data collection and analysis tools, comprehensive practical exercises and the application of OSINT techniques in realistic scenarios are rare. When practical exercises are conducted, they encounter two major pitfalls:

First, exercises are often carried out in the „wild“ using real data in the real information environment and addressing real questions. This approach poses considerable legal and ethical challenges. In a regulatory environment, it can be particularly problematic, as exercises conducted in the real information environment can leave data traces that might reveal sensitive information. The use of real data, therefore, requires careful consideration and strict adherence to data protection regulations to safeguard the integrity of the data and the privacy of individuals [9].

Moreover, many practical exercises concentrate on the collection, processing, and analysis of data. This emphasis means that other crucial aspects of day-to-day OSINT use, such as teamwork, communication skills, and the integration of OSINT results into strategic decision-making processes, do not receive sufficient practical training. These skills are especially important in interdisciplinary teams that bring together diverse expertise and perspectives. Therefore, practical training

should encompass not only technical skills but also soft skills such as teamwork, critical thinking, and effective communication to ensure a well-rounded education. Overall, the OSINT education landscape is diverse, but the focus often remains on the initial phases of the Intelligence Cycle, particularly data collection and processing. There seems to be a lack of comprehensive standards, and implementing practical training can be challenging. Holistic training programs that cover all phases of the Intelligence Cycle and address topics such as leadership, management, and the establishment of OSINT teams are scarce, yet urgently needed [1, 10].

5. Teaching and Training OSINT Holistically: Approaches for Future Education and Training

The development and implementation of holistic training approaches could significantly enhance OSINT education and address the challenges described. The current training landscape already includes many valuable individual aspects and elements that could and should be integrated into a comprehensive approach.

Holistic training approaches aim at fostering comprehensive competence in action, encompassing knowledge, skills, and attitude. These elements form the foundation for acquiring competence and its subsequent application [11]. Achieving cross-organizational holistic competence in OSINT can be envisioned through three key aspects: the design of holistic training and education programs, the use of proven and innovative teaching methods, and incentives for continuous learning and professional development.

5.1 Standardized Training from Basic to Expert Level

A holistic OSINT training approach requires the development of a standardized curriculum that can be applied universally across various organizations and authorities. The goal is to impart fundamental knowledge and skills that are essential across many agencies. Additionally, this curriculum should foster the „OSINT mindset,“ cultivating the appropriate way of thinking necessary for effective OSINT application [12].

While standardization is essential for teaching basic principles, the specific characteristics of individual organizations, including their fields of application for OSINT, tasks, and methods, must also be considered. Specific, advanced training programs should be developed to impart specialized knowledge and skills in a needs-oriented manner, thereby building further necessary competencies in a targeted way.

The holistic aspect should also be integrated into the actual training content for both basic and advanced training courses. These programs should cover all phases of the OSINT process, consider ethical and legal implications, and address interdisciplinary topics such as collaboration and leadership.

5.2 Integrating Diverse Teaching and Learning Methods for Holistic OSINT Training

Educational resources should be designed to train analysts holistically, encompassing knowledge, skills, and attitude. This approach enables analysts to conduct targeted analyses and derive well-founded findings, resulting in high-quality intelligence products. Both theoretical and practical training methods are essential to impart these skills. The current training landscape offers a variety of approaches that can be integrated into a comprehensive program in the future.

Formal Training Methods: These can take the form of on-site seminars, live online training, or e-learning, and are particularly suitable for imparting basic theoretical knowledge. A significant advantage of live seminars is the interaction with other participants, facilitating social learning.

Case Studies: Methods such as learning through case studies are ideal for practical exercises [13]. Learners are given tasks related to specific (often real) cases, conducting OSINT analyses or reenacting past analyses. While this scenario-based method helps bridge the gap between theory and practice, practical exercises in real information environments come with the aforementioned legal and ethical challenges. Sandboxing (see below) is a possible solution to circumvent this.

Project-Based Learning: This method, where learners typically undertake a specific task or analysis in groups, allows for the mapping of the entire Intelligence Cycle and promotes teamwork, collaboration, and leadership [8]. Due to the time required, it is well-suited for longer or continuous courses and can serve as a social learning element, such as in e-learning.

Sandboxing: Interactive simulated learning environments, or „sandboxes,“ represent another highly beneficial approach. While common in fields such as cybersecurity, sandboxes have been underutilized in OSINT, partly due to their limited availability. In existing sandboxes, learners can conduct practical OSINT analyses and experiment with methods and tools without worrying about real-world consequences. This method provides a safe, structured framework and combines many advantages of other approaches [8].

When using simulation training, it is crucial that the simulated environment is as realistic as possible, dynamically adapting to the learners' actions (in the sense of an action-reaction model) and enabling training with different scenarios. Additionally, integrating real OSINT tools and constantly updating the sandbox to reflect the real information environment is essential. Despite these challenges, simulation-based training offers significant potential [8]. Moreover, current offerings are expected to advance further with the integration of AI, particularly enabling training with large datasets.

Gamification/Competitive Learning: Integrating playful elements or competitions is another effective learning method. For instance, capture-the-flag (CTF) games can be used, where learners are tasked with finding specific information or solving challenges as quickly as possible and competing against each other [14]. Initial attempts to incorporate such playful elements into OSINT training have proven effective and could be seamlessly integrated into comprehensive education and training programs [15].

The choice of learning methods for designing training programs ultimately depends on the specific objectives. However, learning psychology, pedagogical, and didactic approaches can be employed to make these training courses as effective as possible.

The 70-20-10 model serves as a useful example [16]: according to this model, adults learn best when 70% of their time is spent on practical experience, 20% through social interactions and exchanges, and 10% through traditional formal education and training. While the accuracy of the model is debated in research, and it remains questionable whether only 10% formal learning is sufficient, it provides a useful framework for structuring training programs.

5.3 Continuous Learning and Further Training

Finally, a holistic approach should also encompass continuous learning and further training. Due to the rapid pace of technological development, the emergence of new tools, applications, and methods, and the need for background and contextual knowledge, OSINT analysts must regularly engage in further training [17]. Educational resources must therefore be consistently updated and adapted. Incentives, such as certifications, should be created to encourage ongoing professional development. Furthermore, cooperation, interaction, and the mutual exchange of knowledge between private organizations, political bodies, authorities, and intelligence services are essential to ensure comprehensive and up-to-date learning [12].

The implementation of holistic approaches presents a promising opportunity to address gaps in the current OSINT training landscape and ensure comprehensive training in the field. Establishing various certifications along standardized training paths from basic to expert level appears particularly promising. This approach would not only promote high-quality standards in training and further education but also facilitate cross-divisional cooperation between OSINT analysts and teams [18].

6. Launching Comprehensive OSINT Training Programs

While highly desirable, the concrete design and implementation of specific education and training programs should not be underestimated. Achieving this requires partnerships and cooperation between various stakeholders, including universities, applied sciences

institutions, private training providers, and government authorities – ideally at an international level. OSINT is a global field, and the challenges and threats faced by OSINT analysts transcend borders. International conferences, exchange programs, and joint research projects can help to bring in global perspectives and foster mutual learning.

To promote the acceptance and implementation of new training programs, support from managers and decision-makers within the involved organizations is crucial. They must recognize the importance of comprehensive OSINT training and allocate appropriate resources, including financial support and the time and opportunity for employees to participate in training and education programs.

Moreover, the role of new technologies in training should not be underestimated. Modern learning platforms, online courses, and digital tools can significantly enhance the reach and effectiveness of training programs, enabling flexible learning that adapts to the individual needs and schedules of learners. Immersive learning and simulation environments, such as virtual and augmented reality (VR and AR), are expected to play an increasingly important role in the future. These technologies allow for the execution of realistic scenarios and the acquisition of practical experience without the risks and ethical considerations associated with real data. AI is also likely to make these simulations more realistic and cost-effective, thereby promoting their widespread use in OSINT training.

7. Conclusion: Holistic Approaches for Future-Proof OSINT Training

The need for effective and comprehensive training is undeniable given the growing relevance of OSINT. It has become an essential tool for authorities, companies, and journalists to make informed decisions and solve complex problems. However, significant gaps remain in the current training landscape, particularly regarding standardization, practical application, and continuous training.

Implementing holistic training approaches that encompass theoretical knowledge, practical skills, and ethical considerations is crucial. By integrating

advanced technologies such as AI, simulations, and innovative learning methods like gamification, training programs can be modernized and made more effective. Equally important are the development of standardized curricula, investments in necessary infrastructure, and the promotion of continuous training opportunities.

The challenges of the modern IT landscape require a new generation of OSINT analysts who are highly trained and capable of quickly adapting to new developments. Only through comprehensive and future-oriented training can we ensure that OSINT users perform their tasks efficiently and responsibly. Implementing holistic training approaches offers the opportunity to significantly improve the quality and effectiveness of OSINT training. By combining theoretical knowledge, practical application, and continuous professional development, we can train a new generation of OSINT analysts well-equipped to meet the complex demands of today's information landscape.

In conclusion, transitioning to holistic education and training approaches is a necessary step to meet the increasing demands of OSINT. With the right support and collaboration, a robust and dynamic OSINT training landscape can be created, prepared for the challenges of the future.

The third paper examines the legal framework and ethical issues surrounding the topic in greater depth. It provides a unique in-sight into the challenges and uncertainties of this discipline. Publication date: 02.09.2024.

Contacts



Sophia Klewer
Author
Chief Operating Officer bei PREVENCY
✉ sophia.klewer@prevenicy.com



Timo Keim
Leiter Public Security Academy
✉ Timo.Keim@esg.de



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