Report

Knowledge Development in Military Context

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Abstract- Nowadays technologies, the parties, the time, etc. are differentiated and there has been a continuous change in the operational environment. In this case, the commanders or decision makers are forced to take right, rapid and instant decisions. Thus, the needs for accurate and timely knowledge of the commanders or decision makers increasingly come to the fore. In order to meet the needs of necessary knowledge, Knowledge Development have been improved and put into practice. At this point, it is possible to be a direct correlation between the accuracy of the decision and the effectiveness of the Knowledge Development process. In order to comprehend the security environment better and find out new or alternative ways for solutions, International Conference on Military and Security Studies (ICMSS-2015) was held in Turkish War Colleges Command, Istanbul on March 10th and 11th. This report is prepared to present the summary of one of the workshops which is "Knowledge Development (KD) in Military Context" for the purpose of helping the research in the field of the study. In the first part of the report there is the statistics and information about the workshop. In the second part, there will be an evaluation of the KD process from positive and negative angles. In the third part, the delivery of the workshop will be assessed and finally in the last part there will be the outputs and conclusions of the workshop.

Keywords- Intelligence process; knowledge development; social media; tacit knowledge.

1. Introduction

Processes and information supporting the decision-making already exist within organizations. The problem is that the information or isolated knowledge often resides in the heads and offices of subject matter experts across (and external to) the organization, consequently it is not fused, de-conflicted, or shared, at least not in a formal, well-established manner nor it is often available in an electronically retrievable format. Therefore, there is a need to connect or fuse existing information, and the processes that are employed to develop it, so that the decision-makers are presented with a clear holistic understanding, as early as possible in the decision making process [1].

This is the purpose of Knowledge Development (KD), which is a proactive process that covers the collection, analysis, storage and distribution of information that helps to contribute to a common and shared understanding of the

operational environment. It provides commanders and their staff with a comprehensive understanding of complex environments, including the relationships and interactions between systems and actors within the engagement space [2].

Knowledge Development has many similarities with Knowledge Management concept. It would be better to present the relation between them. KM consists of four stages; discerning knowledge, choosing a container, conveying and handling the composed knowledge. Comprehending the interrelation of four stages is crucial. Knowledge may be fruitful if it is shared [3]. KM is related with decision making process. Decision making process is based on situation and it's a kind of learning organization. Decision makers have to comprehend interactions about events [4]. In this point IKM is widely apllied to understand ongoing process.

KD is reinforced by IKM (Information /Knowldge Management). Not only it sustains KD process, but also it makes knowledge attainable for users. But KD and KM differs in some ways. While KD applies konewledge for decison makers, KM procure knowledge for all organisation. [2]

As seen in Fig.1, all KD process and KM are applied for attaining knowledge. System analysis is executed for operating KD process.

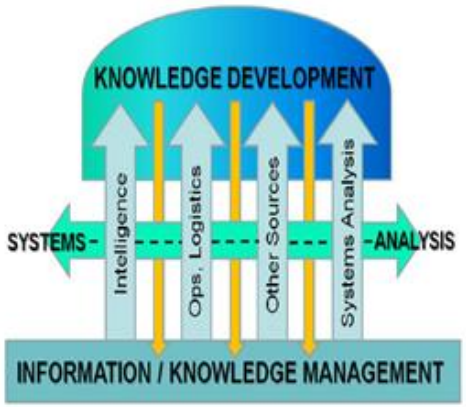

Fig. 1. KD and KM Relations.

To overcome these challenges, International Conference on Military and Security Studies (ICMSS-2015) was held in Turkish War Colleges Command, Istanbul on March 10th and 11th. The conference drew officers, academics, entrepreneurs from defense industry, strategists, decision makers and innovators from across 18 countries. Other than the sessions, four different workshops *Knowledge Management & Information Systems, Knowledge Development, Decision Making & Artificial Intelligence and Leadership & Mission Command* were held during ICMSS 2015.

The questionnaire and feedback forms were used at the workshop about participants' comment on the knowledge development in military context. Moreover, for the report, comments (in sections two and three) have been organized under the general categories of 'positive or most useful aspects' and 'least useful aspects and ways of improving'. Thematically similar comments have been grouped together into one representative comment, followed by a number in brackets to indicate the frequency with which this comment was made. Furthermore, the workshop topics, results and submitted papers are available on the www.harpak.edu.tr/ICMSS website.

2. About the Workshop and Participants

The idea of the KD workshop was to create a framework for the field of intelligence process and techniques. In this workshop, we introduced key aspects of the different viewpoints and models for knowledge development to come up with one model that satisfies everyone's prescriptions and requirements.

Number of participants: 28

Number of feedback forms received: 12

Participant's profile is presented in Table 1:

Table 1. Participant's Profile

Job Role	Number of Participants
War College Students	10
Academicians	2
Researchers	4
Other Military Staff	7
International Attendees	5 (1 Algeria, 1 France, 1 Germany, 1 Italy, 1 USA)
Total	28

The main aims of the workshop were to bring together the decision makers, commanders and participants in academia and army, to share knowledge and experience about the content of the workshop, to promote awareness on the

Knowledge Development (KD) in Military Context, to increase the collaboration among participants and institutions, to present the current research, applications and implementations regarding the topic, and to discuss the topic in details for future developments. For that purpose, 10 articles of which the abstracts and authors are presented in the appendix were submitted and presented in the workshop with the titles depicted in Table 2.

Table 2. Articles Submitted to WS-2

Nu.	Title of the Article
1	Is Intelligence Cycle Still Viable?
2	Transition from Intelligence Cycle to Intelligence Process
3	The Knowledge Development Concept
4	The Effects of Technological Developments on Knowledge Development
5	Knowledge Refinement
6	Structured Analytical Intelligence Tools and Techniques
7	A New Discipline of Intelligence: "Social Media"
8	Use of Unmanned Aircraft Systems (UAS) at Knowledge Development Process as the ISR Collection Means
9	Open Source Intelligence in Knowledge Development
10	A Proposed Model for Knowledge Development

3. Evaluation of the Topic

a. Positive and Most Useful Aspects:

(1) Recently there have been discussions about intelligence cycle.

(2) The intelligence cycle process has been defined during the 2nd World War, so it has to be revised in accordance with the today's developments both in technological and operational environment. [6]

(3) With the invention of new technologies, data that have to be handled have become more than ever. This huge data have to be processed quickly in order to exploit them effectively. [7]

(4) The military environment has shifted far beyond of expected. The cycle mainly based on procedural approaches other than conceptual ones. Because procedural ones are insufficient to meet expectation of commanders and their decision making processes. [8]

(5) KD is a staff-wide conceptual and result-oriented process across all command levels to develop a comprehensive understanding of the engagement space and make it available to military leaders to support decision making.

(6) By assessing the Political, Military, Economic, Social, Infrastructure and Information (PMESII) domains KD provides a holistic view to operational environment and the adversaries. This eases planning process since all the factors that should be considered for a comprehensive operation plan are appraised. It provides outputs to crisis management system as well as the operations planning process. [9]

(7) With the help of newly emerging technologies, the amount of data that has to be handled for intelligence is much bigger than ever. Since the total data is endless and intuitive techniques are inadequate to cope with this big data, the use of analytical and structured techniques become crucial. Structured and analytical intelligence analysis tools and techniques must be used for knowledge development. [8]

(8) For analysis human nature is a main factor which should be handled carefully. Mind-sets are unavoidable impediments which mislead an ongoing process. They may affect the process, in a way that kills creativity, while impeding the invention of more alternatives. Moreover, human nature tends to behave according to accepted mind-sets. Therefore, firstly identifying, secondly avoiding the ill-effects of unavoidable mind-sets is a crucial reason for the application of structured and analytical analysis tools and techniques.

(9) Processes and information supporting the decision-making already exist within organizations. The problem is that the information or isolated knowledge often resides in the heads and offices of subject matter experts across the organization. Therefore, making this tacit

knowledge explicit (in the heads of SMEs) is crucial for knowledge development. [10]

(10) Social media is popular topic that has aroused recently. By the exploitation of social media properly, relationships and interactions between systems and actors within the operation environment will be more transparent. [11]

(11) The open-source intelligence (OSINT) demonstrates to be extremely dynamic, especially after great improvements in media, and might probably be the intelligence branch showing the most advanced interaction of activities belonging to all phases of intelligence cycle. [12]

(12) OSINT and its contribution to Knowledge Development process will supply an additional leverage capability and indicate technical or classified assets to refine and validate intelligence. [12]

(13) The current intelligence cycle does not provide enough flexibility due to bureaucratic structure and strict execution; that interoperability between the collection means is at a very low level; that the current improvements developed for conventional warfare will not meet real time or near-real time intelligence requirements for hybrid warfare which is future warfare environment; that the proposed model is the Network Centric Intelligence. It is seen that All-Source Intel Analyst model in Multi-Intelligence structure used in the NATO can be used easily with this with this model. [13]

(14) Besides the usage of Unmanned Aerial Vehicles (UAVs) as Intelligence, Surveillance and Reconnaissance (ISR) means, their usage within the Network Centric Intelligence as means of communication relay make them an alternative to the satellites. Current network-centric structures are only operated satellite-based which creates vulnerabilities. Therefore this model can be used especially in the in joint operations based on coast and in range of 200-300 km which Line of Sight (LOS) is feasible to be used. [14]

(15) Communication relay may be described as a station which surveys messages from one point to another. It extends range of communication. There can be applied different methods for extending ranges. UAV is one of them applied during recent years. Tactic UAVs such as Fire Scout, Predator and Hunters can be used for extending ranges. By the help of the UAVs, data gathered from different UAVs and different ranges, can be disseminate to the intelligence center. Relay role of UAVs can be extended from one vehicle to another. So intelligence gathering ranges reaches to maximum. [14]

(16) It is found out that the proposed Network Centered Intelligence model's exposure on meteorological conditions is out of question and that such trouble will be disposed of because for any level UAV the operation of this model is feasible. [14]

b. Least Useful Aspects and Ways of Improving the KD:

(1) The usage of KD in the organizations lacking clearly defined KD policy may result in security breaches.

(2) The intelligence staff's and information system managers' duties, area of responsibility, must be separated and coordinated with each other.

(3) Current organizational structures may not be flexible to benefit efficiently from KD activities.

(4) Keeping up the latest technologies that simplify the implement of KD may not be possible.

(5) The human element of KD is believed to remain the main element of even the most sophisticated KD information systems. No matter how much automated information systems are developed, ethics and values resume as main gap between the machine and the human that could not be close in the near future. [15]

4. Evaluation of the Delivery of the Workshop

a. Positive and Useful Aspects of the Workshop:

(1) There were participants from different parts of Turkey and the World. Discussions and working with partners from other areas improved the quality of the studies.

(2) KD was evaluated and discussed from different perspectives of military aspects.

(3) The importance of the feedback was highly valued by the attendees.

(4) The format of the execution was successful in terms of the research and presentation techniques during the workshop.

(5) The workshop was useful for defining the problems faced in the field of KD, such as;

- Effect of the emerging technologies on the DIKW (Data-Information-Knowledge-Wisdom) hierarchy and the KD process,
- Tacit knowledge in the intelligence process,
- Transition from intelligence cycle to intelligence process,
- Social media as a new intelligence discipline,
- Advances in sensor system as an intelligence collection asset,
- A model including all intelligence disciplines.

(6) The workshop was enjoyable and informative for all the participants.

b. Least Useful Aspects and Ways of Improving the Workshop:

(1) Use of Materials

Perceived ways in which the use of the workshop materials could be improved were:

(a) Having extra copies of handouts ready in case of attending more participants than expected.

(b) Real case studies could be used during the discussions as starting points to reach more realistic results in the end of the workshop.

(c) The sample essay could be shorter in order to simplify the comprehension and application of the submitted articles.

(d) A variety of sample essays could be used (analyzed and discussed) to lighten the path towards a feasible, flexible solution to KD problems.

(2) Format and Organization

Perceived restrictions of the format and organization of the session and ways of addressing them were:

(a) More time could be given to read in order to cover a broader range of subjects.

(b) The structure and objectives of the session could be set out at the very beginning so that each participant would prepare more comprehensively for the workshop.

(3) Miscellaneous

Other comments participants made with respect to their experience of the workshop session were:

(a) It was difficult to grade an essay without knowing the criteria and previous information or guidance that was given to the researcher.

(b) It would be helpful to have more information on how core criteria have been embedded and any problems that were encountered.

5. Outputs of the Workshop

a. KD should be used for reaching intelligence not only for strategic level but also tactical and operational levels. And the KD process should be run concurrently at all levels. [13]

b. We need intelligence information systems for the each of intelligence disciplines to reach the more efficient and actionable intelligence and knowledge.

c. Observed gathered, collected, stored, and shared data should be analyzed applying all intelligence sources and technologies to achieve better decisions and outcomes. As seen in Fig.2, there has to be transition from traditional intelligence cycle to intelligence process. [13]

d. System Analysis Tool (SAT) is an extremely important tool for system analysis. However, using only SAT or leaving the final decision to the machine may result in many faults. So, intelligence staff should be aware of a human element of the KD process. [10]

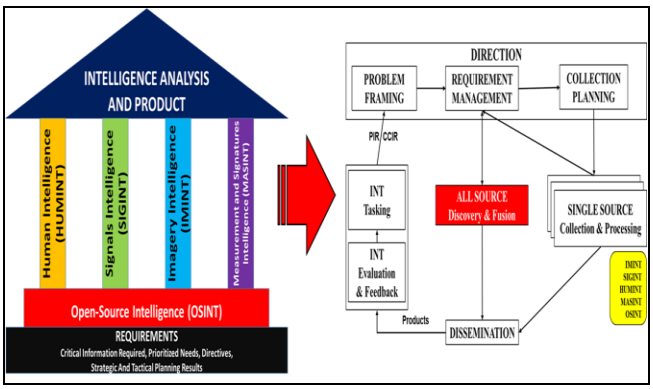

Fig.2. Transition from Traditional Intelligence Cycle to Intelligence Process.

e. Thanks to epochal advances in sensor system and technology used for the KD process, it has been caused to speed up and shorten the KD process. As a result of this development, information and the data intertwine each other and create a new notion called "Infodata" in the literature of DIKW hierarchy (Fig.3). [10]

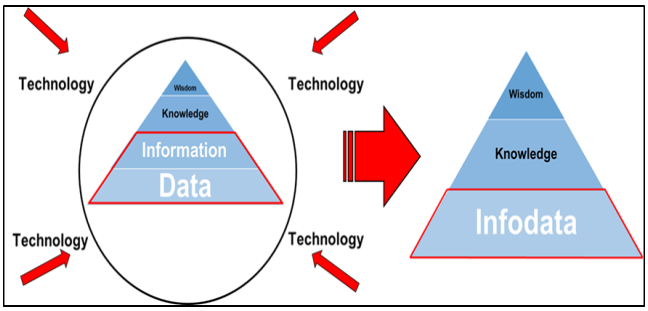

Fig.3. Effect of Emerging Technologies on the DIKW Hierarchy.

f. Nowadays, the usage of social media as a communication path is substantially increasing. It has already reached a huge extend to present peerless opportunities for intelligence staff. So, to benefit from social media effectively as a source of intelligence, social media should be categorized as one of the main disciplines out of OSINT (see Fig.4.) In addition, some legal regulations and structural amendments should be made in order to make social media as one of the exploitation areas. [11]

g. It requires too much experienced intelligence staff and SMEs to manage the KD process.

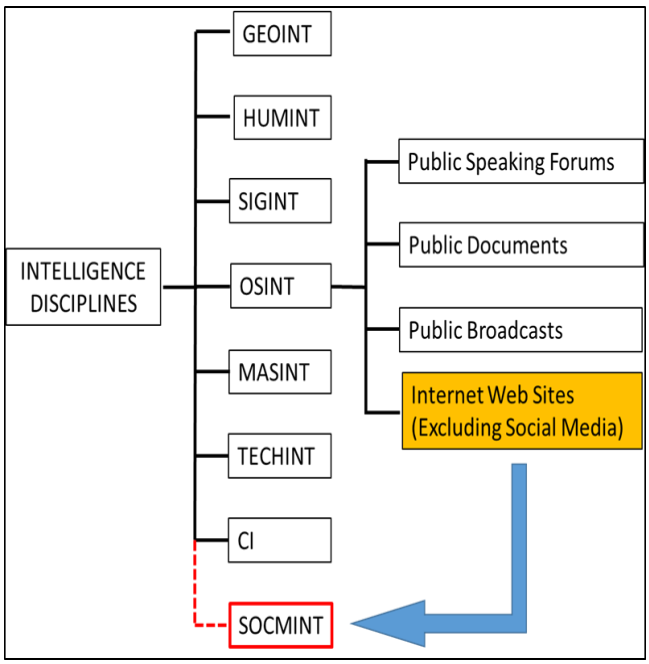

Fig.4. SOCMINT as a New Intelligence Discipline.

h. UASs' ability to fly long hours at low costs than the manned ISR aircrafts, minimum risk to the human component of the system, capability of accomplishing missions under CBRN conditions and superior talent to collect data and send it to the analysts in real time make UASs indispensable for ISR collection at knowledge development. UAS transfers the instant view, evaluation staff in the ground control station analyzes the views and present them to the appropriate user and after understanding the operational environment by this quick process the rapid actions can be taken. The information that's gathered from the UAV mission can be send even to the foot soldier at the field. This makes UASs' great collection assets. [14]

i. In the recent KD model, it could be seen that KD is consist of a subsequential intelligence functions unlike covering the collaborative intelligence functions. The counter intelligence, information technologies and the relationship with other processes also could not be depicted on the current KD process. A proposed model for KD is below (Fig.5), covers both all the inadequacy listed previously and the human, the main or permanent element of the all process, in the context of mission & end state. [15]

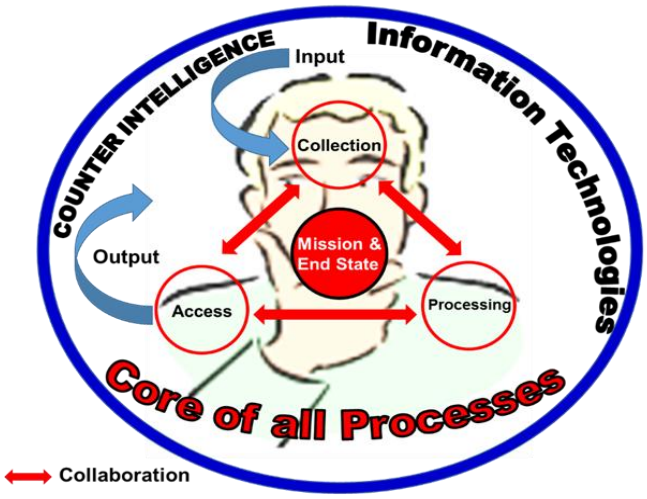

Fig.5. A Proposed Model for Knowledge Development.

6. Conclusions

This study reports the outputs of workshop on Knowledge Development at the International Conference on Military and Security Studies (ICMSS-2015) held in Turkish War Colleges Command, Istanbul on March 10th and 11th. This report presents the summary of one of the workshops which is "Knowledge Development (KD) in Military Context" for the purpose of helping the research in the field of the study.

The workshop gave participants mindful and self-aware of what could go wrong in the interaction between planning, tasking, collection, analysis, and distribution. Moreover, it encouraged participants to seek for better strategies and processes for a more effective KD. It also helped participants to find a common vocabulary and understanding of the complexities of our cognitive processes and organizational dynamics. The workshop also reinforced the growth of the military intelligence analysis discipline and its body of knowledge.

Data which has to be handled has grown more than ever. This data must be analyzed in correct manner to take advantage of it. KD process which has begun to be used in recent years would help to transform data to intelligence as well as knowledge. By the help of new technologies, data might be analysed more convenient. For future projects, KD has to be handled with emerging technologies. Relations between KD and KM have to be defined and analyzed with the help of big data analytics.

It is finally concluded that to safe and secure countries, knowledge and knowledge managements are important more than ever to keep peace, mission and end state.

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APPENDIX

	Paper Title	Author	Abstract
1	Is Intelligence Cycle Still Viable?	Z.Ozleblebici B. Aydin	Today the world has been experiencing dazzling changes on many fields as well as technology. Intelligence cycle was mainly prepared due Soviet threat. After the collapse of Soviet Union, concept of security has shifted drastically. So people have started to question its validity. The biggest question is about the intelligence cycle model. May the process can meet today needs? If not so what should we do in order to attain effective intelligence? This paper deals with intelligence cycle and the future of it.
2	Transition from Intelligence Cycle to Intelligence Process	E. Buker	The defense technologies which have been developing and changing rapidly, today make it difficult to be able to foresee the next environment and spectrum of warfare. When said change and development is looked in specific to the naval operations, it can b e said that the possible battlefield and scenarios to be developed in the near and middle terms (5–20 years) are more clarified with comparing to other force components. Network Centric Naval Warfare Concept that was developed for the floating, diving and flying fleet platforms which serve away from its own mainland for miles, will keep its significance in the future. Accordingly, Network Centric Intelligence structure completely integrating with the command and control systems will have relatively more importance. This study will firstly try to figure out the transition from the traditional intelligence cycle that is still used in conventional war to Network Centric Intelligence Production Process. In the last part, the use of this new approach on the base of UAV that is alternative to satellite based command control and data transfer systems in the joint operations in narrow seas will be examined, a model suggestion for the use of operative and strategic UAVs which are assured within the scope of the NATO AGS2 for this aim will be brought.
3	The Knowledge Development Concept	O. Oz	Knowledge Development (KD) is a proactive process that covers the collection, analysis, storage and distribution of information that helps to contribute to a common and shared understanding of the operational environment. Knowledge Development (KD) is the integration of isolated data into a useable body of information and relationships. KD is a staff-wide process across all command levels to develop a comprehensive understanding of the engagement space and make it available to military leaders to support decision making throughout the Crisis Management Process by acquiring, integrating and analyzing relevant military and non-military information across all pertinent interrelated systems.
4	The Effects of Technological Developments on Knowledge Development	Y. Ekiz	Knowledge development is a proactive process that covers collection, analysis, storage and distribution of information that h elps to contribute the understanding of environment. To transfer knowledge correctly and fastly, you have to use new emerging information systemtechnologies. Actionable knowledge is only of value if it is understandable and usable by target users. The purpose of the paper is to enlighten how technology ease and affect the process of knowledge development. Technology and knowledge development are inseparable. On the other hand, classification of knowledge is the most important part of the knowledge development process. As a result, today there is huge data. This data must be classified sharply and quickly.
5	Knowledge Refinement	O. Ozdemir A.Beyazkurk	Using Information Technology to Refine the Developed Knowledge is the main crux todays intelligence challenges. Stepping into the 21st century, the world has acquired different tools to develop data. Most of them evolved objectively while others were a coincidence. Information Technology (IT) is one of them. At the same time Knowledge Developers, who are the indispensable assets to comman ders, keep up their work for the sake of the newborn IT systems like Data Mining and Knowledge Refinement. Refined knowledge makes life simpler, decision times shorter, and reduces costs. In this regard, this study tries to explain the relationship between Knowledge Development (KD), Knowledge Refinement and IT systems.

6	Structured Analytical Intelligence Tools and Techniques	U. Oner	Data analysis and the related field of Intelligence and intelligence analysis have become increasingly important in military literature over the past two decades. With the help of newly emerging technologies, the amount of data that has to be handled for intelligence is much bigger than ever. All modern armies and nations have been using structured, analytical intelligence analysis tools and techniques. Thus the focus of today's analysis necessitates both immediate response and deeper analysis. In such a circumstance, it is vital to apply more 'to the point' researches; while aggregating numerous methods and techniques, expert views, and data mining's at once. Although there are numerous techniques and tools for making analysis, they do not refer to certain types of problems. The selection of one, or the combination of more of the techniques and tools depend on the needs of the system and type of the problem. It is vital to realize that, in today's wide range of information world, the optimal combination of those techniques becomes the art of analysis
7	A New Discipline of Intelligence: "Social Media"	C. Arslan M.Yanik	As we live in the age of Internet, social media has changed all the habits and the way of communication for millions of people. The instant messaging and mass communication tools such as Facebook, Twitter, Google+ and LinkedIn, provide opportunities for rapid transfer of people's identities, views, interactions, arguments, and even emotions on public media. This progress also enables to reach some information that is not desirable to be shared when directly asked for. As a result, social media now becomes an environment for collecting and analyzing covert and overt information and turning it into a useful one to share. In this aspect, social media is a subject of Open Source Intelligence (OSINT) in Knowledge Development (KD). Today, social media reached such an extent that all the other forms of OSINT became less applicable and useable when compared to it. This study tries to explain that social media intelligence is an expertise apart from OSINT and social media intelligence has to be categorized in a totally different intelligence discipline out of OSINT.
8	Use of Unmanned Aircraft Systems (UAS) at Knowledge Development Process as the ISR Collection Means	S.Yilmaz	Information and knowledge are indispensable for contemporary operations and peacetime missions. Knowledge Development (KD) provides correct and precise information as to battlefield and adversary to the staff officers and the commander. Although there are many ISR instruments, no single ISR tools provides as much flexibility, capacity and risk-free operations as UASs do. Today one of the most important ISR assets is the UAS in order to provide information to security forces. This article argues that UASs are indispensable assets for Knowledge Development and armies should optimize their usage while conducting ISR missions.
9	Open Source Intelligence in Knowledge Development	C. Cansever	The intelligence obtained from environment by the units of intelligence, in military terms, is not solely classified as covert information but also public information, from open sources. The world is being re-explored by open sources. Publicly available information can be used to widen a broad spectrum of objectives. The importance and connection of open source intelligence (OSINT) perform as a force, supply an additional leverage capability, and indicate technical or classified assets to refine and validate both information and intelligence in order to develop knowledge. This study tries to establish a common understanding and methods of use for army open-source intelligence (OSINT) and its contribution to Knowledge Development process.
10	A Proposed Model for Knowledge Development	Y. Ekiz	Firstly, the intelligence process of national armies (Turkish, UK and US) and NATO will be presented and examined step by step. After that, these intelligence processes will be compared. As a conclusion of the comparison, the similarities/differences of the intelligence processes will be introduced. Considering results/findings of the comparison of the intelligence processes, a proposed model for Knowledge Development will be introduced. As a result, the interoperability and applicability of the new model will be discussed.