

**DIFFICULTIES EXPERIENCED BY THE AUTOMATION UNIT
OF ENGINEERS IN COMPREHENDING TECHNICAL TERMS
AT MAKASSAR AIR TRAFFIC SERVICE CENTER**

***KESULITAN YANG DIALAMI OLEH TEKNISI UNIT OTOMASI
DALAM MEMAHAMI ISTILAH-ISTILAH TEKNIS DI PUSAT
PELAYANAN LALU LINTAS UDARA MAKASSAR***

THESIS

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THESIS

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Written and Submitted by:

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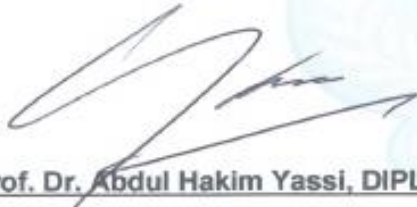
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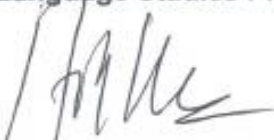
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States truthfully that this thesis was the result of my own work, and it is not the work of others. If it is proven later that either some or entire part of this thesis is the work of others, I am willing to accept any sanctions for my dishonesty.

Makassar, 7 December 2020



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RUPIAH

NUR SHELLA FIRDAUS

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Nur Shella Firdaus

ABSTRACT

NUR SHELLA FIRDAUS. 2020. “Difficulties Experienced by The Automation Unit of Engineers in Comprehending Technical Terms at Makassar Air Traffic Service Center”(Abdul Hakim Yassi and Sukmawaty)

This research is aimed to describe the things that Automation Engineers have done to overcome difficulties in understanding technical terms, describe the impacts of misunderstanding technical terms by Automation Engineers, analysis the improvement of Automation engineers in understanding technical terms, and analysis the causes of misunderstanding technical terms experienced by Automation engineers.

In this research, the researcher using quantitative and qualitative research methods. The population of this research consists of 12 engineers from the Automation unit of engineers at MATSC. The percentage of misunderstanding technical terms is obtained from the tests given to the respondents. In addition, the researcher conducted direct interview to obtain other information that can be used as data in this research.

The result of this research is known that the main cause of misunderstanding technical terms is the limited ability of the automation engineer in English, then one of the impacts of misunderstanding technical terms is financial loss for the company. To improve the ability to understand technical terms, the Automation engineer makes personal notes for the technical terms and their meanings. To overcome difficulties in understanding technical terms the automation engineers discuss with colleagues regarding the technical terms that appear on the system. Based on the findings and discussions, one of the suggestions from the researcher for the Automation engineer is to improve English language skills, and suggestion for the company is to add an English test for selection to become an Automation engineer.

Keywords: Terms, Technical Terms, Automation, Engineer

ABSTRAK

NUR SHELLA FIRDAUS. 2020. “Kesulitan yang Dialami Unit Otomasi Engineer dalam Memahami Istilah Teknis di Makassar Air Traffic Service Center”. (Abdul Hakim Yassi dan Sukmawaty)

Penelitian ini bertujuan untuk mendeskripsikan apa saja yang telah dilakukan oleh Automation Engineer untuk mengatasi kesulitan dalam memahami istilah teknis, mendeskripsikan dampak kesalahpahaman istilah teknis oleh Automation Engineers, menganalisa hal yang dilakukan Automation engineer untuk meningkatkan kemampuan dalam memahami istilah teknis dan menganalisa penyebab kesalahpahaman istilah teknis yang dialami oleh Automation engineer.

Dalam penelitian ini peneliti menggunakan metode penelitian kuantitatif dan kualitatif. Populasi penelitian ini terdiri dari 12 engineer dari unit Otomasi di MATSC. Persentase kesalahpahaman istilah teknis diperoleh dari tes yang diberikan kepada responden. Selain itu peneliti melakukan wawancara langsung untuk mendapatkan informasi lain yang dapat digunakan sebagai data dalam penelitian ini.

Hasil dari penelitian ini adalah diketahui bahwa penyebab utama kesalahpahaman istilah teknis adalah terbatasnya kemampuan engineer otomasi dalam bahasa Inggris, kemudian salah satu dampak kesalahpahaman istilah teknis adalah kerugian finansial bagi perusahaan. Untuk meningkatkan kemampuan memahami istilah teknis, engineer Otomasi membuat catatan pribadi untuk istilah teknis dan artinya. Untuk mengatasi kesulitan dalam memahami istilah teknis, para engineer otomasi berdiskusi dengan rekan kerja mengenai istilah teknis yang muncul pada sistem. Berdasarkan temuan dan pembahasan, salah satu saran dari peneliti untuk Automation Engineer adalah untuk meningkatkan kemampuan bahasa Inggris, dan saran untuk perusahaan adalah menambah tes bahasa Inggris untuk seleksi menjadi seorang engineer Otomasi.

Kata kunci : Istilah, Istilah Teknis, Otomasi, Teknisi

LIST OF CONTENTS

APPROVAL SHEET	i
STATEMENT OF AUTHENTICITY	ii
ACKNOWLEDGMENT	iii
ABSTRACT	v
ABSTRAK	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
LIST OF APPENDICES	xii
CHAPTER I INTRODUCTION	1
A. Background of Research	1
B. Research Focus	5
C. Research Questions	5
D. Objectives of the Research	5
E. Significances of the Research	6
CHAPTER II LITERATURE REVIEW	8
A. Previous Studies	8
B. Theoretical Background	11
1. Semantics	11
2. Lexical Meaning	13

3. Terminology	14
4. Common Technical Terms	15
5. Technical Terms in Radar and Surveillance System	16
CHAPTER III RESEARCH METHODOLOGY	22
A. Research Method	22
B. Data Collection	23
C. Data Analysis	24
D. Research Instrument	24
CHAPTER IV FINDINGS AND DISCUSSION	25
A. Research Finding	25
B. Discussion	35
CHAPTER V CONCLUSION AND SUGGESTIONS	42
A. Conclusion	42
B. Suggestions	43
BIBLIOGRAPHY	45
APPENDICES	48

LIST OF TABLE

Table 1 Steps of restart system	17
Table 2 Engineer's Tenure	26
Table 3 percentage member of automation unit	26
Table 4 Terms in AMSS / Flightplan System	28
Table 5 Percentage of engineer's understanding of terms in AMSS	29
Table 6 Terms in ATS System	32
Table 7 Percentage engineer's understanding of terms in ATS system	34

LIST OF FIGURE

Figure 1: Engineer's Logbook	2
Figure 2: Application term in linguistics	14
Figure 3: ATC Automation System Process	30
Figure 4: System Repairments Flowchart	36
Figure 5: Warning Message on ATS System Screen	38
Figure 6: Interpretation of Engineer SI	39
Figure 7: Interpretation of Engineer NM	40

LIST OF ABBREVIATIONS

MATSC	Makassar Air Traffic Service Center
ATS	Air Traffic Service
ATC	Air Traffic Controller
ADSB	Automatic Dependent Surveillance- Broadcast
ADSC	Automatic Dependent Surveillance- Contract
AMSS	Automatic Message Switching System
ASD	Air Situation Display
CWP	Control Working Positions
FIR	Flight Information Region
FL	Flight Level
LAN	Local Area Network
ATSU	Air Traffic Service Units
AIDC	ATS Interfacilities Data Communications
NOTAM	Notice to Air Man
LAM	Local Acknowledgement Message
HMI	Human Machine Interface

LIST OF APPENDICES

- Appendix I : Tests Question and Result of Automation Engineers
- Appendix II : Recap of weekly report data from Automation Engineers
logbook
- Appendix III : List of Interview
- Appendix IV : Research Permit

CHAPTER I

INTRODUCTION

In this chapter consist of several subchapters which are going to be explained. These subchapters are as follows: (A) Background of the Research, (B) Research Focus, (C) Research Questions, (D) Objective of the Research, (E) Significant of the Research

A. Background of the Research

General aviation covers various types of activities, commercial and noncommercial, including private flights and flight training. Flight service is not independent but requires support from several parties and related agencies, such as Air Traffic Controller, aircraft engineer, air navigation engineer, airport services, etc. Aircraft fly from point to point guided by Air Traffic Controller through the radar system and several other aircraft surveillance systems, such as ADSB (Automatic Dependent Surveillance-Broadcast), ADSC (Automatic Dependent Surveillance- Contract) and FPL (Flight Plan) tracks that are displayed on a screen called ASD (Air Situation Display) or CWP (Control Working Positions).

Communications is the process of delivering messages or information from someone (communicator) to others. The term communication is invariably seen as a relational state, that is, as a “pattern of interconnections” (Rogers, 1998). Another expert said, communication is seen as the means by which people construct and maintain relationships, along with a set of skills or skill deficits that contribute to relationship adjustment (Burleson, Metts & Kirch, 2000). Communication must use language that is understood by both parties to avoid error in information. In addition, coordination is an activity carried out by many parties from a particular organization to achieve a common goal with the agreement of each party so that there are no mistakes in working. Language as a system that uses words to communicate with others. Special languages have

similar functions but at different levels. Studying and mastering the domain's vocabulary will give opportunity to understand specific subjects and communicate about them.

Radar systems and surveillance systems are equipment systems maintained by air navigation engineer consists of Automation, Telecommunication and Navigation units. Each of these units coordinates with each other in equipment's maintenance, both in carrying out schedule of maintenance or in equipment repairment in case of damage. Besides, the engineers also coordinate with other site engineer of each equipments, for example there is a problem with the Kupang's radar, the engineer in Makassar must coordinate with the Kupang's radar engineer so that the problem can be solved and monitored together.

Uraian Masalah Kerusakan

A Normal text ▼
Bold
Italic
Underline

Kupang's radar data was "TIME_OUT" start from 00.08 UTC.

action taken by engineer:
move the cable on the radar splitter.
old cable arrangement as follows:
MDF LA - MDF Airnav - Splitter LA - Airnav Splitter
new cable arrangement as follows:
MDF LA - Splitter LA - MDF Airnav - Splitter Airnav
current conditions are normal. start normally at 03.03 UTC

Figure 1: Automation Engineer's Logbook

In the Figure 1 above there is the term "time out" where this term is a term in network problems. for engineers who understand the term "time out", the troubleshooting of the problem will be quickly resolved because it immediately knows that the main problem is the network issue that used to send data from Kupang to Makassar. Then, the problem will be long handled if the engineer does not understand the term "time out" due to many terms for error message on radar data.

In carrying out maintenance and equipment's problem troubleshooting, the engineer follows the SOP (Standard Operating Procedure) that has been made and agreed together, then writes the activities on the logbook so that if there is any unsolved damage, it can be continued by the engineer on duty in the next shift. On each equipment there is a manual book written in English which contains many technical terms and most of the term is difficult to understand because it is not a general technical term which means it can be easily searched on the internet.

The researcher takes place the research in MATSC (Makassar Air Traffic Service Center). MATSC is a provider of air traffic guidance services in the Ujung Pandang FIR region, covering 2/3 of Indonesia's air regions, for enroute flights above FL (Flight Level) 240 both domestic and international flights. MATSC is the eastern Indonesian air traffic guide. Makassar Air Traffic Service Center have an obligation to maintain air traffic safety in eastern Indonesia, where the engineer as a provider of air communication and navigation devices to guide the aircraft and provide information in the such as weather or air traffic to aircraft which passing through eastern Indonesian airspace.

Term is the language used to describe a specific thing, or the language used within a specific field. Technical Terms is a term used by related parties in a particular field or unit. In carrying out their duties, the engineer coordinate at any time to user if there is a problem with the equipment to guiding the aircraft both communication equipment and navigation equipment. In this case it is very susceptible to miscommunication due to misunderstanding of the terms used, especially for new employees.

A case that has happened in MATSC due to misunderstanding terms is lost the flight plan data. It is affected to the billing system used by the company to collect route charges from airlines. This caused a lot of financial losses for the company. These technical terms are important to understand because even if one word is wrong, it can have a big impact.

Another case that have occurred, but not in the MATSC area. Ukrainian Boeing 737-800, which was shot down by an Iranian missile in Tehran 8 January 2020. The Iranian president said that based on an internal investigation of the armed forces, this missile was fired because of human error which hit a commercial plane belonging to Ukraine Airlines, causing 176 people death. Previously, the Iranian Armed Forces also said the downing of the Ukrainian airlines was caused by a human error and the plane was flying in an area close to sensitive military locations. The Iranian Armed Forces said the plane was shot down because it thought it was an enemy target. Iran's Civil Aviation Authority said that Failure occurred due to human error in following procedures for the radar integration. Errors in the integration procedure caused the radar to be misaligned and the radar deviated by 107 degrees. The CAO said that, despite the erroneous information available to the radar system operator on the aircraft's trajectory, he could have identified his target as an airliner, but instead there was a "wrong identification".

From the cases explained above, the terms are very important and must be understood by engineers. If there is a misunderstanding it will causing a fatal error that can lead to a plane crash. There are so many terms in the system that must be understood, therefore the researcher conducts this research to analyze the difficulties of Automation engineer with the hope that it can make it easier to understand the technical terms.

According to Aeronautical Telecommunications in Annex 10 (2001) Communication procedures including those with Procedures for Air Navigation Services (PANS) status said that "Definitions of terms used in the Standards and Recommended practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have independent status but is an essential part of each Standard and Recommended practice in which the term is used, since a change in the meaning of the term would affect the specification". From that point, it is known that the definition of terms in aeronautical communication has a special meaning and cannot be interpreted word by word through a

dictionary because it can change the real meaning. For this reason, the researcher raised this research entitled "Difficulties Experienced by the Automation Unit of Engineers in Comprehending Technical Terms at Makassar Air Traffic Service Center".

B. Research Focus

This research discusses the difficulties in understanding technical terms experienced by Automation engineers at the Makassar Air Traffic Service Center. This study using technical terms that arise during the study as material for observations and respondents from the Automation units of engineers at the Makassar Air Traffic Service Center.

C. Research Questions

Some questions emerged from the background stated in the previous subchapter. These questions would be answered within this research and are listed below:

1. What are the causes of the misunderstanding technical terms experienced by the Automation unit of Engineers?
2. What are the impacts of misunderstanding the technical terms by the Automation unit of Engineers?
3. How do the Automation unit of Engineers improve their understanding the technical terms?
4. How do the Automation unit of Engineers overcome difficulties in understanding technical terms?

D. Objective of the Research

Based on the research questions mentioned above, this research aimed to fulfill targets, as follows:

1. Describe things that automation engineers have done to overcome difficulties in understanding technical terms.

2. Describe the impacts of misunderstanding the technical terms by Automation unit of Engineers.
3. Analyze the improvement of Automation unit of Engineers in understanding technical terms.
4. Analyze the causes of misunderstanding technical terms experienced by Automation unit of Engineers.

E. Significant of the Research

Upon the completion of this research, the researcher hopes the result to possess these significances:

1. Practical Benefits

This research would help the Automation unit of Engineers in troubleshooting equipment problems. Then it is shorten the time for the problem analysis, equipment repair, and reduce the risk of more severe equipment damage for aviation traffic safety.

2. Theoretical Benefits

This research would also be benefit as a resource or reference for future researchers who are interested in conducting similar research, especially on technical terms in engineering field. The results of this research can also be used as learning materials for participants on the On the Job Training at Makassar Air Traffic Service Center.

CHAPTER II

LITERATURE REVIEW

This chapter consist of several subchapter which are going to explained. The subchapter are as follows: (A) Previous Studies, and (B) Theoretical Background.

A. Previous Studies

Research on technical terms in engineering field is rare. But these earlier researcher presented a discussion of the terms and their opinions on the terms. Below are previous studies which have been conducted by some researcher as Pamela Faber's research entitled "Frames as a framework for terminology," Maksym O. Vakulenko's research entitled "Term and Terminology: Basic Approaches, Definitions, and Investigations Method," and Almammadova Sabina Mammad's research entitled "The Concepts Term and Terminology in the Modern Azerbaijan Language."

1. Pamela Faber

Pamela Faber's research entitled "Frames as a framework for terminology" published in 2014. Pamela Faber using cognitive approach based on frame-like presentations to terminology. Pamela using cognitive approach in the form of conceptual templates underlying the knowledge encoded in specialized text. The result of her research is "Frame-Based Terminology" (FBT) concept and argue that terminology apply ideas "frame", is defined as the definition of experience (knowledge structure), represented at the conceptual level and stored in long-term memory and ones related elements and entities related to certain cultures or study, situation or event from human experience.

From the Pamela research known that the cognitive approach in linguistic theories could be applied to the specific context of the terminological analysis. Pamela Faber argues that terminology is undergoing a "cognitive shift" and that their approach involves the cognitive processes involved in organizing, understanding and naming specialized knowledge. FBT focuses on conceptual organization in a specific domain and assumes that the terminological units have a multidimensional character. In FBT, the knowledge of terminology in a domain is organized in a general and abstract event structure that serves as the basic representation for other events in that domain.

In this research, it is found that Terminology is a subject of linguistic analysis. Terms as a branch of terminological theory. These findings are very helpful for this study because they discuss the terms. The researcher agrees with the concept of FBT which explains the terms as a conceptual framework and a specialized language in a certain context. This study does not discuss technical terms. However, this research is related to theory terminology and terms used in certain fields of sciences.

2. Maksim O. Vakulenko

Another study that raises the topic of terms is Maksym O. Vakulenko's Journal. The journal entitled "Term and Terminology: Basic Approaches, Definitions, and Investigation Methods (Eastern-European Perspective)" was published in 2014. In his research, Maksym using descriptive approach by including the definition of terms from several historical evolution and terms interpretation. The result of his journal is summarizing the definitions of terms that he mentioned in his journal. The summarizing and amending of Maksym O. Vakulenko journal can be presented that term is a word or collocation that refers to a certain concept in a particular field of human endeavour: science, technology, culture, sports, art, etc.

Maksym discussed the difference between Term and Terminology perspective from the eastern europeans. One of the concepts mentioned in his journal is "Terminology as a science studies the rules and laws of the formation, development and operation of terms in a particular context of the human undertaking, and also enjoys the statistical and analytical research methods. The comprehensive use of the well-defined investigation methods in terminology manifesting the shift from terminology teaching to terminology science is equivalent to the transition from critical disource to the puzzle soloving inherent to science" (cf. Kuhn 1970b, 6-7). In his journal, Maksym also mentioned that through a descriptive approach, terms are not special words but special functions. Within this approach, the opposition between term and word proved to be very productive in the terminological theory. Most of these special functions are inherent to the ordinary words. Moreover, there is no clear boundary line between the common vocabulary and terms. Besides, terminology not only as a vocabulary, part of lexicology or a teaching (doctrine) but also as a separate independent science about term formation and operation that uses statistical and analytical methods.

This journal discusses various approaches to concepts and terminology. Maksym O. Vakulenko generalized relevant comprehensive definitions of various concepts about terms. Similar to previous research, this research does not concern about technical terms. However, by the some of term concepts mentioned in this journal, it really helps other researchers to develop other research related to the terms.

3. Almammadova Sabina Mammad

"The Concept Term and Terminology in the Modern Azerbaijan Language" was the title of Almammadova Sabina Mammad's Journal on 2015. With using descriptive approach, Almammadova Sabina Mammad discusses the language that is evolving and is always changing or increasing in the language of Azerbaijan. The result of his journal are his opinions that "the term "terminology" was translated in two meanings. Then, It is stated that terminology sometimes used in two meanings, both in

narrow, limited meaning and in wide meaning: while stating terminology in the limited, narrow meaning, the system of terms reflecting the collection of the system of notions of a certain (concrete) area of science, technique, economy, culture and agriculture". In the wide meaning terminology as a general collection of the terms used in all areas is deemed.

In this journal explained that the terms differ from other word-groups by their expression and meaning, utilization opportunities, the role of the language in different stylistic areas, the level of understanding of the language carriers. Though that there are different ideas about the term and its essence in the linguistics, there are the problems that wait for a solution, because understood every new notion and concept shall be named by certain language of each units. Different principles are taken as basis in this naming and different conformities to the law are substantiated. Especially, there are certain differences in the naming of terms. Thus, as naming is after understanding of the object, the semantic relation between the name and the named object and its essence is taken as a basis. However, special naming (nomination) is realized in the terminological concept in the process of expression of different scientific, technical notions and concepts of the terms. Then the appointment of the terms according to their essence because the meaning of terms is limited by the system of certain scientific-technical knowledge and its meaning is determined in the system of scientific-technical knowledge that they concern. Just the terms in the system of this knowledge serve the naming of notions, processes, and events, etc. and marking them by language units having nominative character.

Naming function that has a special role and function in the language is the process of the understanding environment. The terms implement this function like words, but besides, the term appoints the notion from a logistic point of view either. That is to say that the relation as notion-essence, the notion-concept shows itself in the terminological system. Notions are the element of thought and the means of understanding of the matter and reflect principal signs of concepts included in certain areas. The conceptual

meaning is based on the meaning of the term in certain context. Besides, not only the thing notion meaning but also the notion concept meaning concerning certain context, limited by certain context is based on the meaning of such term.

From the related study mentioned above, The researcher agree with the opinions written by the researcher mentioned above. Then, researcher concluded that that the term is a symbol in language in the particular culture or science. Terminology is the science of terms. Then term is a word and a combination of words used in a particular context. The technical term is an important part of all technical and scientific writing. Each field and specialization usually use vocabulary that conveys various special concepts through technical language. These special terms convey concentrated meaning that has been built up during a significant period of field study. In addition, terms are special words or expressions that express the meaning of a concept, process, situation, or characteristic that is unique in a particular field, and can be used as a "key word" or a word or concept with special features, which means the word is used as a key. and code or used to link to other words or other informations.

B. Theoretical Background

1. Semantics

Related to previous studies which stated that the term is a concept, then this is related to the semantics study about meaning.

The word semantic comes from the Greek, Sema (noun) which means sign or symbol, and the verb Samaino which can be referred as marking or symbolizing. Semantics is a branch of linguistics that studies the meaning contained in language.

Some of researcher quote some opinions from linguists about the definition of semantics. According to Griffiths (2006: 15) semantics is defined as "The study of word meaning and sentence meaning, abstracted away from contexts of use, is a descriptive subject", this theory shows that semantics is a science that studies the meaning of words and sentence

meanings that can be seen from the context of use. Saeed (1997: 3) also has the same opinion with Griffith, that "Semantics is the study of the meaning of words and sentences or semantic is the study of meaning communicated through language", according to Saeed semantics is a science that studies the meaning of words and is a science. which studies the meaning of communication through language.

However, there are also some linguists who argue that semantics is a science in the field of linguistics that studies meaning in language, as suggested by Hurford (1984: 1) "Semantics is the study of meaning in language" and Harmant and Stork (1999: 13). "Semantics is the system of study of meaning in language". According Palmer (1981: 1), "Semantics is the technical term used to refer to the study of meaning, and since meaning is a part of language, semantics is a part of linguistics", Palmer also argues that semantics is a term that refers to on the science of the meaning of language and semantics is one branch of linguistics.

Based on the definition of linguistics above, it can be concluded that semantics is a branch of linguistics that studies the meaning of words and the meaning of sentences as well as a tool in giving symbols of knowledge to the vocabulary of a language and its structure to develop a more detailed meaning so that it can be communicated in language.

The meaning has a wide scope to be described, so often this causes diversity in interpreting the meaning of an utterance and writing. The term meaning is sometimes confused, but a dictionary can be used to see the meaning of a word. What is explained in the dictionary is a lexical meaning. In everyday life, we often encounter the meaning of a word that cannot be found in a dictionary. That is why readers or listeners are sometimes dissatisfied with the meaning contained in the dictionary for a word that is looking for meaning. This will appear when dealing with idioms, language styles, proverbs and expressions.

2. Lexical Meaning

The lexical is an adjective form derived from the lexicon noun form (vocabulary). The unit of the lexicon is the lexeme, which is the unit of a meaningful form of language. If the lexicon is equated with vocabulary, then the lexeme can be equated with a word. Lexical meaning can be interpreted as meaning that is lexicon or word. It can also be said that Lexical meaning refers to the real meaning, meaning that proper with our sense of observation, or granted meaning. It has been known that a language has an amount of lexical system by which the semantic with structure could be based its meaning on paradigmatic and systematical. Linguistic units that can be identified without joining other linguistic units are called lexical meaning (Wijana and Rohmadi, 2011: 14).

The lexical meaning of a word is contained in a word that stands alone. It means that the meaning of a word can change when the word is already in a sentence. Thus, there are words whose lexical meanings can be understood if the words have been constructed with other words. Words like this belong to groups of task words or particles. Lexical meaning is also the smallest meaning unit in the meaning system of language that could be distinguished from other similar units. A lexeme is an abstract unit. It can be occurring in many different forms of actual spoken or wrote sentences, and regarded as the same lexeme even when infected.

Lexical words, also known as content words, have concrete meaning that goes beyond their function in a sentence. These words refer to things, people, actions, descriptions, or other ideas that have more than just a grammatical usage. Their meaning is easily identified by a clear concept or item. Lexical meaning refers to the real meaning, meaning that proper with our sense of observation, or granted meaning. It has been known that a language has an amount of lexical system by which the semantic with structure could be based its meaning on paradigmatic and systematical.

3. Terminology

Terminology is the study of terms and their use, and the term is a word and a combination of words used in certain contexts. Then the technical term is a word or combination of words used in the technical world for a specific purpose. Terminology has no clearly delineated theory in linguistic, but terminology as a branch of applied linguistics.

The use of the terms is necessary to enable communication. They combine langue, parole or agreed upon by experts in certain fields and referential world and thus enables communication. Quoted from Kirsten Packeiser's research entitled *The General Theory of Terminology: A Literature Review and a Critical discussion* in 2009 "As concept is given natural predominance over terms, terminology work always starts with the concepts and is working its way from concepts to terms". Packeiser argues that the main focus of the term is the concept, which can be understood regardless of the name or term that represents it.

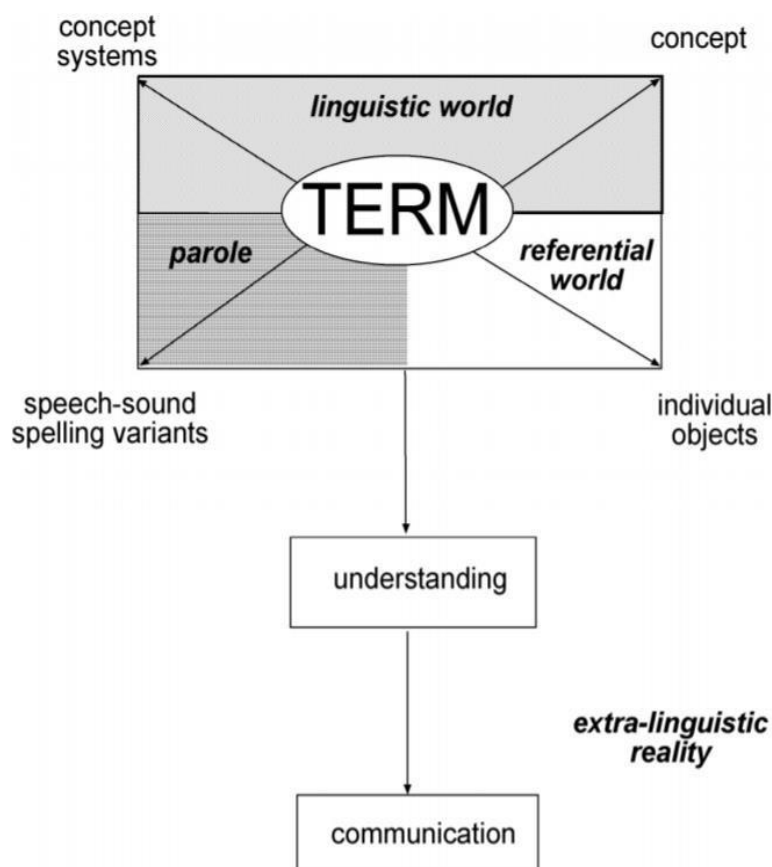


Figure 2: Packeiser (2009) Application term in linguistics

The picture above shows a description of the importance of terms in terminology work. To connect between elements requires terms. Without term there is no understanding and interaction. The terminology enables the development of terminology works from each piece of information that can be used to increase knowledge in a particular domain or subject area.

4. Common Technical Terms

Technical terms exist in a continuum of formality. Precise technical terms and their definitions are formally recognized, documented, and taught by educators in the field. Other terms are more colloquial, coined and used by practitioners in the field, and similar to slang. The boundaries between formal and slang jargon, as in general English, are quite fluid, with terms sliding in and out of recognition. This is especially true in the rapidly developing world of computers and networking. For instance, the term firewall, meaning a computer or network device used to filter network traffic, was coined as technical slang. As these devices became more important and the term became widely understood, the word was adopted as formal terms.

Technical terms evolve due to the need for experts in a field to communicate with precision and brevity, but often has the undesired effect of excluding those who are unfamiliar with the specialized language of the group. This can cause difficulties as, for example, when the new engineer cannot follow the instruction on the manual book that contains many terms, and thus cannot understand his own problems and could make a new problem because of they would do the wrong steps to fix. Differences in jargon also cause difficulties where professionals in related fields use different terms for the same phenomena. For instance, substantial amounts of duplicated research occur in cognitive psychology and human-computer interaction partly because of such difficulties. some examples of technical terms are as follows:

- a) Read-only: A read-only file or storage device contains data that cannot be modified or deleted. While data can be accessed or "read" from a read-only file or device, new data cannot be added or "written" to the device.
- b) Redundancy: Redundancy is exceeding what is normal. In computing, the term is used more specifically and refers to duplicate devices that are used for backup purposes. The goal of redundancy is to prevent or recover from the failure of a specific component or system.
- c) Encryption: Encryption is the process of converting data to an unrecognizable or "encrypted" form. It is commonly used to protect sensitive information so that only authorized parties can view it. This includes files and storage devices, as well as data transferred over wireless networks and the Internet.
- d) Cybercrime: Cybercrime is criminal activity done using computers and the Internet. This includes anything from downloading illegal music files to stealing millions of dollars from online bank accounts. Cybercrime also includes non-monetary offenses, such as creating and distributing viruses on other computers or posting confidential business information on the Internet.
- e) Binary: Binary is a numeric system that only uses two digits — 0 and 1. Computers operate in binary, meaning they store data and perform calculations using only zeros and ones.

5. Technical Terms in Radar and Surveillance System

On radar and surveillance systems or equipment that visually displays radar and surveillance equipment called automation systems, there are terms that must be understood by engineers, for example, such as the following SOP restart system which is routinely carried out every month by different personnel.

Table 1. Steps of restart system

Step Number	PIC	Who	√	Action	Time		Time Allocation
					Start	Finish	
A.0	DOD	MED + ENG		Ensure Service LAN on OPS platform in normal condition			
A.1		MED + ENG		Generate all dataset on DBM platform (offline platform)			
A.2		MOD		Notify all adjacent ATSU(s) regarding the estimate time of system shutdown, especially ATSU which has system correlation with MAATS (i.e. AIDC)			
A.3		ENG		Distribute new dataset on operational			
A.4		MKD + FDO		Record all valid NOTAM			

A.5	MKD + FDO	Record all active adjacent ATSU's radio frequencies and all information in bulletin 1, 2 & 3			
		fields			
A.6	MKD + FDO	Create Testing FPL			
A.7	MOD	Record all airspace activity(i.e. military exercise) in Ujung Pandang FIR, if any			
A.8	MOD	Inform the estimate time of system restart to Briefing Office (ATS reporting office) and Comm. Centre & Tower/ADC			
A.9	MED + ENG	Make Sure Strip Printer Server is OK and Print checklist to be checked			

Step Number	PIC	Who	√	Action	Time		Time Allocation
					Start	Finish	
B.1	DOD	MOD +ATCo		Broadcast to all CPDLC Flights about the time of disconnecting CPDLC service same as T-time (unplug isolated consoles time)			25 mnt
B.2		MOD +ATCo		Check CPDLC histories, send NDA and address forwarding manually to southbound (CPDLC) traffic, if needed			
B.3		MOD +ATCo		Manual end of service for all (southbound and northbound) CPDLC flights			
B.4		MED		Inform that technical preparation for system restart is ready			2 mnt

B.5	ATCo		Advice MOD about traffic condition for deciding the time to isolate CWP			2 mnt
B.6	MOD		Define the time to isolate HMI, and inform that to MKD and MED			1 mnt
B.7	MOD		Define which node is isolate node			5 mnt
B.8	MOD		Re-sectorise isolated console			4 mnt

From the table above found some technical terms as follow:

- Platform : Platform is a combination of software with a programming language used to run an application.
- Console : Console is another term of CWP (Control Work Position), a set of equipment and position used by ATC to guide aircraft from one place to their destination.
- Generate : Generate is program carried out in order to produce instructions or code's program according to the needs of the system, activate the program that has been configured by the engineer and providing information when there is an error.

- AIDC : AIDC (ATS Interfacility Data Communications) is application supports information exchanges between ATC application processes within automated ATS system located at different ATSUs. This application supports the Notification, Coordination and the transfer of Communication and Control functions between these ATSUs [2]
- NOTAM : NOTAM (Notice to Airmen) is notification distributed by telecommunications equipment containing information regarding the determination, conditions or changes in each aeronautical facility, service, procedure, or hazardous condition, and important to be known by air navigation personil.
- Isolated Console : Console or CWP which not included in the process of restarting the system simultaneously so that the ATC still controls aircraft traffic using a radar monitor. The isolated console will be restarted after all CWP (not isolated console) already restarted.
- Boundary/ FIR : FIR (Flight Information Region) / Boundary is Line that mark the airspace limits or the limit on air space which is the responsibility of a country's researcher in providing air navigation safety services called ATS (Air Traffic Services). Air navigation services will be provided in the FIR, consist of all important information and warning services.
- ADC : ADC (Aerodrome Control Tower) guiding aircraft limited by Air Traffic Controller's visibility from the tower.
- CPDLC : CPDLC (Control Pilot Data Link Communications) is communication between Pilot and Air Traffic Controller by text.[3]
- Re-Sectorize : Rearrange sectors in the system according to each control area.