



Level of Science Literacy Among Drugs Abuser in Bima City and Bima Regency

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Abstract: One of the areas in West Nusa Tenggara Province where cases of drug abuse are rampant is Bima City & Bima Regency. Data on drug abuse by the age of 15-25 years in Bima City and Bima Regency even reached 63% compare to its total case. So that researchers are interested in choosing a theme related to the level of scientific literacy of drug abusers in the Bima City & Bima Regency. This study is a quantitative study to determine the level of scientific literacy of drug abusers in Bima City and Bima Regency with a sample of 25 people and using scientific literacy instruments to collect related data. The results of the study then showed that the scientific literacy level had an average achievement of 18.93 which was in the low category. Where for the existing scientific literacy aspect, both the knowledge aspect (K) is in the low category with an average achievement percentage of 21.6% while the competency aspect (C) is in the low category with an average of 24.39%.

Keywords: Drug Abusers; Literacy; Scientific Literacy

Introduction

The development of various technological sophistications in the era of industry 4.0 does not only have a positive impact on people's lives. If it is not handled wisely, it will cause negative things, one of which is drug abuse. The problem of drugs is a never ending problem. Of course, various things then encourage the emergence of this drug abuse. In 2018 the disclosure of drug cases in West Nusa Tenggara itself increased significantly to 734 cases, compared to 2017 which recorded 586 cases.

Drug abuse is even more prevalent among millennials, who in fact are still in the student age range. This can be triggered by curiosity that is not well directed, fad or even intentional caused by information that is not well received or hoaxes related to drugs. One of the areas where cases of drug abuse are rampant is the Bima City and Bima Regency. This is marked by an increase in cases of drug abuse which continues to increase from year to year. Data on drug abuse by 15-25 years old in area of Bima even reached 63 percent (BNNK Bima, 2020).

The OECD (2019) states that what is fundamentally needed are literacy skills as a solution for the community to deal with these changes, especially changes that have a negative impact. Society, especially science teacher must be made aware and bring the relationship between science and socio-cultural issues into the classroom so that they can make life choices based on scientific consequences to our contemporary social context (Lee & Brown, 2018). Unfortunately, according to the International Institute for Management Development (IMD) (2022) in its annual report The Global Competitiveness Report (2022), Indonesia is ranked 44th out of 56 countries, and this is the worst ranking in the last 5 years since 2018 (IMD, 2022). This is exacerbated by the achievement of scientific literacy reported by the OECD through the Program for International Student Assessment (PISA) in 2018 which showed that Indonesia was ranked 70 out of 78 countries with a scientific literacy score of 396, far below the global scientific literacy average with a score of 489 (OECD, 2019). This condition at least gives an illustration that the quality of education, especially scientific literacy in Indonesia is still relatively low compared to many other countries,

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even though scientifically literate society itself is important and create an important role for someone to rationally and critically understand person's quality of life, both politically, socially and/or economically in everyday life (Al Sultan et al., 2018).

Furthermore, so far West Nusat Tenggara is ranked second in the case of illiteracy in Indonesia. This was conveyed by the Minister of Education and Culture of the Republic of Indonesia, Muhajir Effendi at the commemoration of National Literacy Day which was held in Kuningan, West Java, September 8, 2017. The number of illiterates for ages 15-59 years was 7.91%. The position of West Nusa Tenggara is only under Papua. Meanwhile, in 2016 West Nusa Tenggara was also in the same position with a higher percentage of 10.62%. In particular, based on data from the West Nusa Tenggara government in 2016, the Human Development Index of Bima Regency was in seventh position, while Bima City was in a better position, which in the second position out of 10 existing regions in West Nusa Tenggara.

Seeing this position, of course, West Nusa Tenggara, more specifically, the Bima City and Bima Regency are in a state of dire need of strengthening the literacy movement. This movement is not only useful for the process of human development in West Nusa Tenggara, but also plays an important role in the process of creating the character of a society that is dynamic, open and ready to face global competition.

Taking into account the importance of scientific literacy for the life of the global community in this era of industry 4.0, the researchers are interested in choosing a theme related to the level of scientific literacy of drug abusers in Bima City and Bima Regency. So that the results of this study can later be part of the implementation of prevention, eradication, abuse, and illicit drug trafficking in the community of Bima City and Bima Regency.

Method

This type of research is a quantitative study to determine the level of scientific literacy of drug abusers in Bima City and Bima Regency. Research activities were carried out in Bima City and Bima Regency, West Nusa Tenggara.

The population in this study were drug abusers in Bima City and Bima Regency who received rehabilitation therapy treatment at the Bima Regional National Narcotics Agency Primary Clinic, where the total population until August 2021 was 27 people. In this study, samples were taken randomly (random sampling) based on the criteria of respondents who were drug abusers and undergoing rehabilitation, namely 25 people. The number of samples is obtained by calculating based on the Slovin formula as equation 1.

$$n = \frac{N}{N(d)^2 + 1} \tag{1}$$

Information:
 n: sample
 N: Population
 d: 95% precision value or significance by 0.05.

The variables in this study consisted of two variables, which is the control variable and the dependent variable. The control variable is scientific literacy and the dependent variable is drug abusers.

The instrument used in this research is a set of questions containing scientific literacy skills. The Scientific Literacy Instrument is in the form of questions and questionnaires related to scientific literacy that will contain understanding related to scientific concepts related to several natural phenomena and also related to approaches to science literacy properly. Scientific literacy competencies can be in the form of explaining scientific phenomena with scientific knowledge, evaluating and organizing scientific investigations, and interpreting scientific data and findings (Adnan et al., 2021; OECD, 2019; Saraswati et al., 2021). The grids related to competence and scientific literacy indicators as well as a map of the distribution of the questions can be seen in the Table 1.

Table 1. Competencies and Indicators of Scientific Literacy as Well as a Map of The Distribution of Questions

Science Literacy Competencies	Science Literacy Indicators	Question Distribution
Explain phenomena scientifically	- Able to explain scientific phenomena with the right understanding of science	1, 2, 4, 6,
	- Can apply science and patterns of scientific attitude in life	5, 8, 9
Evaluate and design scientific enquiry	- Able to understand basic statistics (such as graphic patterns and simple calculations)	3
Interpret data and evidence scientifically	- Students are able to generate scientific conclusions accurately	7, 10

The data collection method uses a quantitative data approach. Quantitative data was obtained through questions related to scientific literacy for further data

analysis. Data analysis was carried out to obtain conclusions. Analysis of the data used on the instruments tested are descriptive and quantitative analysis. Quantitative analysis was carried out to obtain validity related to the instrument used and this study was used the Content Validity Ratio (CVR) model which is a content validity approach to determine the suitability of items with the domain measured based on the decisions of experts (Mubarak & Yahdi., 2020). In this study, a CVR value of 0.99 was obtained with a CVI score of 1.83. Based on the acceptance criteria compiled by Lawshe (1975), it can be concluded that the instrument used to measure scientific literacy in drug abusers is valid.

The next step is to measure the reliability value of the instrument. The calculation of the reliability of the test instrument gained by using Cronbach alpha with the help of SPSS 16 which show the results of = 0.74 for scientific literacy instruments so that the reliability criteria can be accepted with a value of > 0.70.

Interpretation of The level of scientific literacy achievement data in the given science application is based on the score they get after filling out the scientific literacy instrument. The category criteria used (Henukh et al., 2021; Jufrida et al., 2019) based on the score intervals obtained are illustrated in Table 2.

Table 2. Interpretation of Scientific Literacy Categories Based on the Score Obtained

Score interval	Categories
81-100	Really high
61-80	High
41-60	Moderate
21-40	Low
0-20	Very low

After testing the items in the scientific literacy instrument used, the respondents' answers were grouped based on the possible patterns of respondents' answers. Respondents' understanding and conception of each possible answer were analyzed based on the hierarchical pattern of scientific literacy proposed (Hayati, 2017). Scientific Illiteracy: respondents were unable to relate and respond to some questions related to science. They do not have dictionaries, concepts, context, or the cognitive capacity to identify questions scientifically.

Nominal scientific literacy: Respondents know some concepts related to science, but are not able to understand them clearly, causing misconceptions. Functional scientific literacy: Respondents were able to explain concepts correctly, but their understanding was limited. Conceptual scientific literacy: Respondents develop several schemas about understanding the main concepts of the discipline and relate these schemas to a more general understanding. Inquiry and technology design are included in this level.

Multidimensional scientific literacy: This perspective combines an expanded understanding of science with other disciplines such as philosophy, history, and social dimensions in science and technology. Respondents were able to combine their understanding with issues from other disciplines. If then this category is included in the respondent's answer pattern on the scientific literacy instrument based on the category revealed by Erman, et al. (2019), then we can see the hierarchical position in the respondent's answer pattern based in Table 3.

Table 3. Classification of Respondents' Answers on Scientific Literacy Instruments.

Tier 1	Answer Combination		Classification of respondents' answers
	Tier 2	Tier 3	
Correct	Correct	Certain	Conceptual/multidimensional scientific literacy
Correct	Incorrect	Certain	Functional science literacy
Incorrect	Correct	Certain	Nominal scientific literacy
Correct	Correct	Uncertain	Nominal scientific literacy
Correct	Incorrect	Uncertain	Nominal scientific literacy
Incorrect	Correct	Uncertain	Nominal scientific literacy
Incorrect	Incorrect	Certain	Scientific illiteracy
Incorrect	Incorrect	Uncertain	Scientific illiteracy

Result and Discussion

While science cannot answer questions about ethics and values, it can provide facts that can help people make informed decisions. Becoming familiar with the facts on all sides of the issue and careful consideration of possible positive and negative impacts on individuals, society, or the environment can help people decide on a course of action based on data which help people make a better decision (Hernan et al., 2019). Therefore, scientific literacy has become an important issue and has received wide attention among scientists, educators, and many policy makers in recent years (Fischman et al., 2018). Scientific literacy is a person's ability to use scientific knowledge and processes to make decisions regarding the universe. Scientific literacy as a functional understanding of science plays an important role in everyday life (Ke, et al., 2021). In the 21st century, people who have scientific knowledge and about the latest technological issues are needed. Science Learning aims to develop skills and creativity based on scientific knowledge relevant to everyday life and decision making for problem solving (Jufrida et al., 2019).

In measuring the level of scientific literacy in drug abusers, a grid is used that divides the domain of

scientific literacy into aspects of knowledge and scientific competence (OECD, 2019; Henukh et al., 2021) where scientific knowledge is divided into content knowledge (K1), procedural knowledge (K2) and epistemic knowledge (K3) (Saraswati et al., 2021) as well as scientific competencies in the form of Competence to explain scientific phenomena (C1), Competence to identify scientific problems (C2) and Competence to use scientific evidence (C3) (OECD, 2019) as illustrated in Table 4.

Table 4. Literacy Aspects and Topics Proposed in the Instrument

Topics	No. Item	Aspects of Scientific Literacy					
		Knowledges (K)			Competencies (C)		
		K1	K2	K3	C1	C2	C3
Climate and weather	1	√			√		
Scientific method	2		√		√		
Air and Pollution	3			√		√	
Health Disaster Threat	4			√	√		
Energy	5	√			√		
Scientific Attitude	6		√			√	√
Chemical and Body	7	√				√	
	8	√				√	
	9	√				√	
	10	√				√	

The instrument used to identify the level of scientific literacy this time used a three-tier instrument model. This means that each question item consists of three types of questions. Each tier has a different character. For the first tier are questions related to knowledge of science based on the criteria on the grid, at the second tier are reasons and explanations related to answers at the first tier, then finally at the third tier is the tier of confidence in the answers at the first and second tier. The profile of scientific literacy level is given in the distribution of frequency and percentage as illustrated in Table 5.

Table 5. Frequency and Distribution of Achievements for Each Category Based on Scientific Literacy Scores

Score intervals	Frequency	Percentage (%)	Categories
81-100	0	0	Very high
61-80	0	0	High
41-60	3	12	Moderate
21-40	17	68	Low
0-20	5	20	Very low

The data in table 5 above shows that 88% of respondents are at a low/very low level. While the remaining 12% are at a moderate level, at this level it is known that respondents have the ability to give

conclusions correctly, but it is still difficult to explain phenomena based on scientific knowledge and understand statistics such as graphs and simple calculations (Saraswati et al., 2021). Through the respondent's learning experience about the world of science, the respondent may have read theories related to science but the respondent understands his own understanding in understanding so that misconceptions occur and cannot explain the concept of science properly (Soeharto et al., 2019).

The level of scientific literacy of drug abusers in Bima City and Bima Regency was obtained through the application of scientific literacy instruments related to drugs on drug abusers in Bima City and Bima Regency. Based on the test results, the data obtained as shown in Table 6.

Table 6. Results of Scientific Literacy Level for Each Category of Scientific Literacy Competencies

Scientific literacy competencies	Literacy level (%)	Categories
Explain phenomena scientifically	25.17	Low
Evaluate and design scientific enquiry	16.00	Veri low
Interpret data and evidence scientifically	32.00	Low
Averages	24.39	Low

Based on the data in table 6 above, it can be seen that the level of scientific literacy for competence in explaining scientific phenomena with scientific knowledge has a percentage of 25.17% which is in the low category when compared to the standard set by PISA to be said as literate. Furthermore, the competence to evaluate and design scientific enquiry has a percentage of literacy level as 16.00% which is in the very low category and the last one for the competence to interpret scientific data and evidence which is at the literacy level of 32.00% which means it is in the low category when compared to standards set by PISA to be said as literate. If we pay attention to the respondent's achievement in the existing answer scores on aspects of scientific literacy in the form of knowledge and skills, it can be described as shown in Table 7.

Table 7 shows the achievement level of the scientific literacy aspect which is still very low owned by respondents who are drug abusers. Scientific literacy consists of two aspects namely knowledge and competencies. The knowledge aspect is divided into three categories, respectively known as content, procedural, and epistemic knowledge. Content knowledge includes general knowledge of natural science such as physics, chemistry, biology, earth, and space. Procedural knowledge is described as knowledge of typical procedures used by scientists to acquire valid and reliable data which required to perform scientific

investigations and to clarify the facts of scientific inquiry to assist certain statements. Epistemic knowledge is defined as knowledge to develop and describe important characteristic for building knowledge processes and its rules in science to explain the structure of knowledge (OECD, 2019). Epistemic knowledge plays a role in explain the shaping of scientific knowledge in controlling, judging, and directing the degree of validity based on factual and empirical evidence in scientific study. The justification of scientific features is used in real life as an individual form that reflects scientific literacy. The nature of individual scientific literacy is related to the social organization in which the individual functions (Höttecke & Allchin, 2020; Kelly & Licon, 2018; Queiruga-Dios et al., 2020).

Table 7. Results of Scientific Literacy Level for Each Aspect of Scientific Literacy

Aspect of scientific literacy	Percentages (%)	Categories
K1	33.60	Low
K2	22.00	Low
K3	9.33	Very low
Averages (P)	21.60	Low
C1	24.80	Low
C2	28.00	Low
C3	4.00	Very low
Average (K)	18.93	Very low

The low abilities of scientific literacy in the knowledge aspect can be caused by the fact that the respondents are still lay or not familiar with terms in science (Yanti et al., 2018) or people are not used to being accustomed in answering questions that use reasoning, reading accuracy, and ability to solve problems that help them to understand the content of the reading and need to be accustomed to dealing with real world problem (Lestari et al., 2021). It is essential for society to have a definite understanding of and about science, the collective nature of knowing should not be neglected. Science influence the lives of mankind in all region in various case, consequently, it is very important to gain a progressive scientific literacy level so that they can understand how scientific knowledge is produced, define and redefine. Nevertheless, everyone will not and cannot know all the scientific theories and facts necessary to unravel the peculiarities of socio-scientific problems. Instead, individuals in people demanded to understand on the firmness and boundary of scientific investigation and adapt to implement scientific expertise appropriately.

By paying attention to the meaning of each aspect in the knowledge dimension, of course, this is something that requires great attention in an effort to increase the literacy level of the perpetrators of drug abuse as respondents, especially in category of epistemic knowledge which is at the lowest proportion. It is hoped

that by increasing the dimensions of scientific knowledge in them, in the future they can produce a more mature decision and better problem solving in their lives.

Another thing that is revealed through the scientific literacy test instrument used is the distribution of the relationship between the respondents' ability to answer which is described by the total score they get with the level of confidence they have when answering the questions given. This confidence level has a range from 1 to 5 where 1 = only guessing, 2 = very uncertain, 3 = uncertain, 4 = certain and 5 = very certain. An overview of the distribution of the total score obtained and its relationship to the certainty level when answering can be seen in Figure 1.

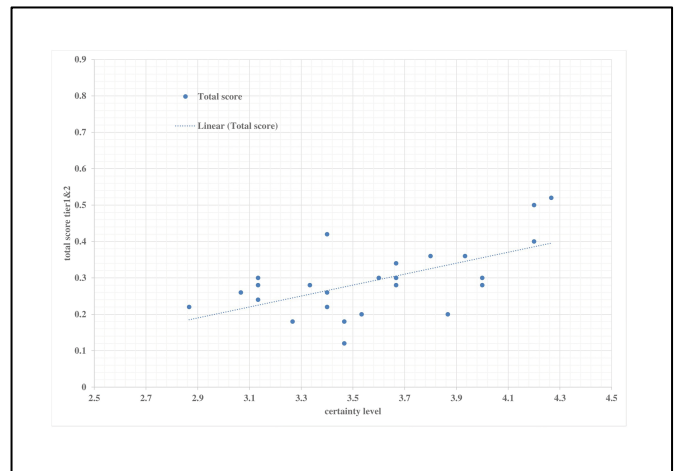


Figure 1. The Relationship between Total Score and Certainty Level When Answering Science Literacy Questions

As seen in Figure 1 almost all respondents have a low level of confidence, which if you pay attention to the average choice of respondents, it can be said that respondents are in a state of doubt (confidence score <4) when giving answers which means they do not have strong beliefs when giving answers and explanation of the problems given in scientific literacy instruments.

The condition of respondent above shows the contradicts to a theoretical concept which states that individuals who have good scientific literacy are "competent outsiders" (Golumbic et al., 2020; Keren, 2018; Kuglitsch, 2018; Osborn & Pimentel, 2023; Sharon & Baram-Tsabari, 2020). Namely those who can, first, recognize when science is relevant to their needs and interests, and second, adaptively "interact with sources of scientific expertise in ways that help them achieve their own goals," or to "enrich their understanding of their own lives." In another picture, it can be considered as expressed by Hayati (2017) as a condition of science illiteracy in which individuals are unable to relate and respond to answers to several questions related to science. They do not have dictionaries, concepts, contexts, or the cognitive capacity to identify them.

scientific questions that cause them to be unable to recognize and respond to scientific issues logically Erman et al. (2019), or in nominal literacy conditions where individuals know several concepts related to science, but are not sufficiently able to understand them clearly which can lead to on the formation of misconceptions in the individual (Erman et al., 2019).

Multiple factors may influence the achievement of scientific literacy in Indonesia, such as (1) the socio-cultural environment such as the condition of the house that is inhabited (Jufrida et al., 2019). This shows with whom a person interacts and how far the level of education possessed by his parents where this is related to the second factor (2) namely the work of parents, parents who work all day and the minimum time given to be with children also affect the one's literacy achievement. Parents who work most of the time are expected to provide supporting facilities such as books, computers and other supporting facilities for learning activities (Chen, et al., 2019; Hu et al., 2018; Iram & Abida, 2020); (3) The identity factor, namely the level of education, a person with a low level of education also affects literacy achievement. In the case of drug abusers, there are some who drop out of school at the age of junior high school and some even only graduate from elementary school, this of course really determines their perspective in viewing science issues (Chen et al., 2019); (4) Learning motivation and discipline to come to school and participate in learning activities (Sumanik et al., 2021). Drug abusers who are in school age or have graduated from school, have low discipline to be able to attend school and focus on learning. This can make the problems of science in their lives become neglected. Lastly, (5) The role of parents and schools in providing learning facilities and infrastructure (Suparya et al., 2022). In the case of drug abusers with low economic levels, other needs besides the fulfillment of their addictive needs are secondary or even tertiary needs. So that the fulfillment of learning facilities is not their priority and results in their low learning orientation.

Therefore, revisiting scientific literacy to build a new paradigm is highly recommended on the basis that we live in a globally diverse society where diversity of scientific thinking must be encouraged and must dominate as a widely accepted perspective in a knowledge society (Strasser et al., 2019; Valladares, 2021).

Conclusion

In this study, the author describes the level of scientific literacy in drug abusers in Bima City and Bima Regency. the author's data was obtained by providing a scientific literacy test instrument to rehabilitation patients at the Bima Regional National Narcotics Agency primary clinic. Based on the results of the study, it was

found that the scientific literacy level of drug abusers in Bima City and Bima Regency based on the respondents used was 68% in the low category, 20% are in the very low category and only 12% are in the medium category. Then if it is divided into each existing scientific literacy aspect, both the knowledge aspect (K) is in the low category with an average achievement percentage of 21.6% while competence aspect (C) is in the low category with an average of 24.39% and a very low percentage of achievement with an average of 18.93%.

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