The Relationship of Learning Interest in Nutrition and Learning Environment with Nutritional Literacy

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ABSTRACT
The basic skill needed by students to face global competitiveness is literacy, among them nutrition literacy, can support health and productivity. The learning process was influenced by lecturers, learning resources, learning activity, interest of students, and learning environments. The purpose of this study was to analyze the relationships of learning interest and learning environment on nutrition literacy. The research was conducted in a cross-sectional manner with student research subjects studying nutrition at Universitas Negeri Semarang. The instrument for measuring interest and learning environment uses a Likert scale. The instrument of nutrition literacy is measured by a modified Diet and Health Knowledge Survey. Analysis of differences between study programs using Kruskal Wallis followed by Mann-Whitney. To test the association using Gamma correlation. The results showed that learning interest of nutrition 64.9% of students in the moderate category. The learning environment is almost the same for all study programs in the moderate category. There is a positive relationship between learning interest in nutrition and nutritional literacy with a significance of 0.000 > 0.05. Learning interest and nutrition literacy differ between study programs, while the learning environment is not different. Differences in learning interest occur among the Natural Science with the Culinary Education, Public Health Sciences, and Nutrition. Differences in the learning environment only occur between Natural Sciences with Public Health Sciences. There are relationships between learning interest and nutritional literacy and no relationship between the learning environment and nutrition literacy.

Keywords: *Learning Interest, Learning Environment, Nutrition Literacy, Students.*

1. INTRODUCTION

The four basic skills needed by students to face global competitiveness are critical thinking, communication, collaboration, and creativity. Critical thinking requires communication and information literacy skills, to examine, analyze, interpret, and evaluate [1]. To achieve this ability requires a healthy, both physically and mentally. Conditions that students occur at this time who are classified as young adults experience declining health. Obesity rates have increased more than three times that of adolescents. More than one in four people aged 24-32 have hypertension, 69 percent have prehypertension, 7 percent have diabetes, and 27 percent have prediabetes. Obesity has an impact not only during adolescence but also throughout the life course as a risk factor for non-communicable diseases. On the other hand, being underweight (malnutrition) results in limited school achievement, work productivity and causes reproductive health problems. Behavioral tendencies include skipping breakfast and consuming fast food, lack of exercise, and lack of regular physical and dental examinations, contracting sexually transmitted diseases, smoking, using marijuana and hard drugs, and drinking alcohol. The requires a system level approach to create and to maintain the conditions needed for their health and well-being. The areas of action are 1) good health, 2) adequate nutrition, 3) learning and educational opportunities, 4) security, safe, and a clean and supportive environment, 5) responsive relationships and connectedness, and 6) realization of personal autonomy and resilience [2].

Benchmarks can be used to assess health and "well-being" include literacy. Literacy is the ability to read and write. Functional literacy is a level of minimal competence in reading and writing essential for daily life and work [3]. One context related to health is nutrition. Nutritional literacy is the ability to understand basic nutritional information needed to make the right nutritional decisions. Nutritional literacy is the most significant predictor of food quality [4]. Things have not been well done by students, especially related to nutritional information labels and low-fat foods [5].

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Nutritional material was studied by students in the subjects of nutrition in several study programs at UNNES. In the learning process of subjects Nutrition Science is carried out in various ways. Learning is a process of student interaction with lecturers and learning resources in a learning environment [6]. Based on this definition it can be interpreted that learning is influenced by students, lecturers, learning resources and learning environment. The form of learning that is carried out is student-centered, which is determined by activity and interest in learning. Students take more responsibility for learning and subject matter related to their needs and learning styles [7]. The learning process can be carried out directly/face to face/synchronously and indirectly/online/asynchronously [8]. The implementation of face-to-face and online learning requires a different learning environment. The learning environment is the physical setting where learning takes place including learning facilities and infrastructure as well as media, tools and learning resources [9]. In online learning using computer technology, internet networks and quality information technology teams [10]. However, students cannot practice directly in class. Face-to-face learning is generally directed by the lecturer, where students are taught in a way that is conducive to sitting and listening [11]. The availability of a learning environment will support the learning process well, in theory and practice.

Various studies related to interest in learning, learning environment and literacy have been carried out. The classroom literacy environment is indirectly associated with some early reading skills through children's literacy interest and engagement [12]. Tanzanian higher education institutions need to develop virtual learning environments to facilitate the teaching of information literacy courses [13]. Interests tend to devote more time and effort to reading assignments [14], find interesting material, and result in deeper learning [15]. Student interest increases with online learning [16].

Nutritional literacy is a benchmark for food quality, as well as the success of the learning process related to nutrition. The learning process are influenced by lecturers, learning resources, and learning environment and students (including learning activity and interest). This article focuses on the learning interest in nutrition and the learning environment, and its relationship with student nutritional literacy.

2. RESEARCH METHODS

The study uses a cross-sectional approach, where variable data collection is carried out simultaneously [17]. The research subjects were students studying nutrition material at UNNES, with the aim of research knowing nutritional literacy. Nutritional material is studied in the Nutrition Science Course. There are four study programs that have a Nutrition Science Study Program, namely the Natural Sciences (NaS) Study Program, the Culinary Education (CE) Study Program, the Public Health Sciences (PHS) Study Program and the Nutrition (Nu) Study Program.

Students' learning interest in nutrition measured by observers used a questionnaire with three components, namely feelings of pleasure, attention, and exploration [18]. Learning environment indicators are the physical settings where learning takes place including learning facilities and infrastructure as well as media, tools and learning resources [9]. The instrument for measuring interest and the learning environment uses a Likert scale, with a score of 1 – 5. Score 1 is very poor and score 5 is very good. Nutritional literacy (LG) measured using a modified Diet and Health Knowledge Survey (DHKS)/Nutrition and Health Knowledge Survey (NHCS), with indicators on food labels, consumption of carbohydrate-sourced foods, consumption of protein-sourced foods, low-calorie foods, added fat, and extra fat [19]. Scoring uses the guidelines above, with 1 never and 4 very often. These categories of each research variable were presented in Table 1.

Table 1. Category of Learning Interest of Nutrition, Learning Environment and Nutrition Literacy of Students.

Category	Learning Interest of Nutrition	Learning Environment	Nutrition Literacy
Low	10 – 20	10.0 – 20.0	23.0 – 40.2
Less	20.1 – 30	20.1 – 30.0	40.3 – 57.5
Moderate	30.1 – 40.0	30.1 – 40.0	57.6 – 74.8
Good	40.1 – 50.0	40.1 – 50.0	74.9 – 92.0

To describe the learning interest in nutrition, the learning environment and nutritional literacy use the average. The results of the normality and homogeneity tests show that the data is not normal and not homogeneous, so statistical tests use non-parametric statistics. To test differences in study programs on learning interest in nutrition, learning environment, and nutritional literacy, Kruskal Wallis was used, while the Mann-Whitney test was used to determine the difference between study program [20]. To test the relationship between variables using the Gamma Test [21].

3. RESULTS AND DISCUSSIONS

Students of the four study programs have conditions of learning interest in nutrition, learning environment, and nutritional literacy in the same category. Learning interest in nutrition and learning environment in the medium category, nutritional literacy in the less category. The data of the average varies are shown in Figure 1. The Sciences Study Program has the highest average learning interest in nutrition, learning environment, and nutrition literacy compared to other study programs. In contrast, the Public Health Sciences study program has the lowest average learning interest in nutrition and the learning environment. The Culinary Education Study Program has the lowest average in the learning environment. Learning interest in nutrition and the learning environment are in the moderate category so it needs to their improving. A more concerning condition is nutritional literacy in the less category. These results show that students have not mastered the basic nutritional information needed to make the right nutritional decisions. These conditions need to be improved with the learning process in class.

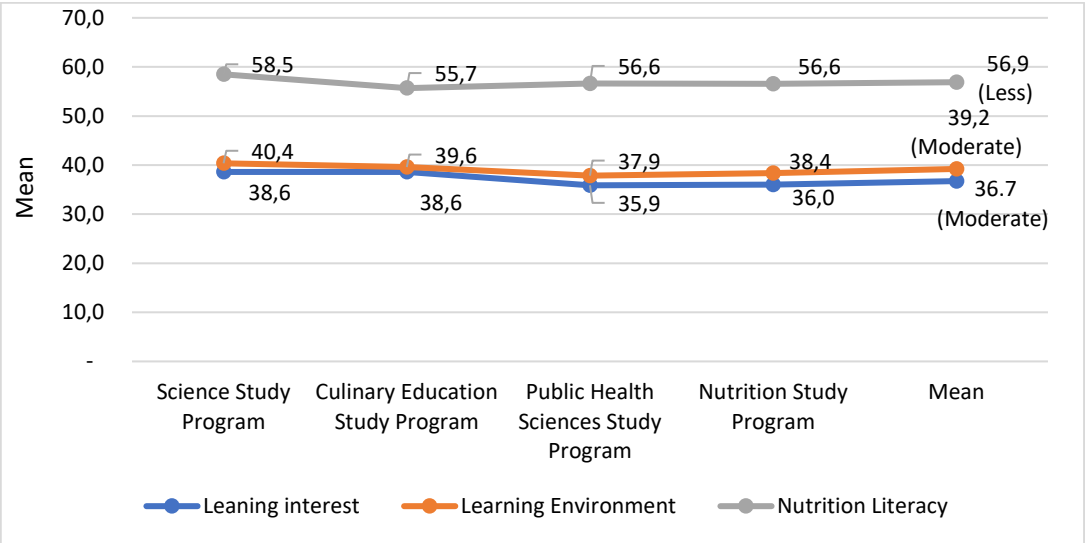

Figure 1. Mean of Learning Interest of Nutrition, Learning Environment and Nutrition Literacy of Students.

The results of the normality test showed that all data were abnormal, with a significance <0.05, so the difference test using Kruskal-Wallis was continued with Mann Whitney. Table 2 shows that the learning interest in nutrition differs between study programs, while the learning environment and nutritional literacy are not different.

Table 2. Results of the Test of Different Conditions of Students Between Study Programs.

Differences between Study Programs	Learning Interest of Nutrition	Learning Environment	Nutrition Literacy
Kruskal-Wallis H	0.020**	0.113*	0.106*
Mann-Whitney			
Natural Sciences - Culinary Education	0.017**	0.557*	0.035**
Natural Sciences-Public Health Sciences	0.019**	0.033**	0.154*
Natural Sciences - Nutrition	0.006**	0.084*	0.143*
Culinary Education-Public Health Sciences	0.984*	0.157**	0.316*
Culinary Education - Nutrition	0.770*	0.214*	0.148*
Public Health Sciences - Nutrition	0.435*	0.454*	0.588*

Note: * There is no difference between study programs
** There are differences between study program

Differences in learning interest of nutrition occur between the Natural Sciences study program and the Culinary Study Program, the Public Health Science Study Program, and the Nutrition Study Program. Differences in the learning environment only occur between science and Public Health Science study programs. Science study program students and Culinary Education have different nutritional literacy.

The link between learning interest in nutrition and nutritional literacy is mainly found in the less and moderate categories. Almost the same percentage, around 60% of students have a moderate learning interest in nutrition but have less literacy levels. The number of

students who have an interest in learning good nutrition is ten times more than good nutrition literacy. The data is presented in Table 2. The results of the relationship test with the Gamma test obtained a value of G = 0.521 and a significance value of 0.000 <0.05. These results show that learning interest in nutrition is positively related to student nutritional literacy.

Table 3. Level of Learning Interest of Nutrition according to Nutritional Literacy Level.

Learning Interest of Nutrition	Nutrition Literacy (%)				
	Low	Less	Moderate	Good	Total
Low	-	-	-	-	-
Less	-	11.7	1.9	-	13.6
Moderate	-	37.7	27.3	-	64.9
Good	-	8.4	11.0	1.9	21.4
Total	-	57.8	40.3	1.9	100.0

Almost the same results occurred in the learning environment and nutritional literacy were gotten. About 60% of students have scores in a moderate learning environment and less nutritional literacy. The data of nutritional literacy is presented in Table 4. Students who are in a good learning environment are fifteen times more literate than good nutrition. The results of the test of the relationship between the learning environment and nutritional literacy obtained a value of G = -0.01 and a significance value between the Gamma test obtained a significance value of 0.948 > 0.05. These results indicate that the learning environment is not related to nutritional literacy.

Table 4. Level of Learning Environment according to Nutritional Literacy Level.

Learning Environment Category	Nutrition Literacy Category (%)				
	Low	Less	Moderate	Good	Total
Low	0	0	0	0	0
Less	0	3.2	1.9	-	5.2
Moderate	0	35.7	24.7	1.9	62.3
Good	0	18.8	13.6	-	32.5
Total	0	57.8	40.3	1.9	100.0

4. DISCUSSIONS

Learning interests is shown by feeling happy in studying nutrition, being active in learning, and giving more time in studying nutrition material and nutrition material outside of the mandatory material. Learning interest in nutrition shows a moderate level. Learning interest in nutrition shows that students have a good curiosity about nutrition. Nutrition is an applied science that is directly related to the health of the human body. Nutrients are chemical components found in food and human body cells. By choosing and consuming foods that contain nutrients and are complete and meet their nutritional needs, it will have a direct impact on the level of health. However, if the consumption of nutrients is less or exceeds the body's needs for a certain period of time it will have a negative impact on their health. Adequate nutrition is essential for optimal health and well-being throughout the life journey, from preconception, children, adolescents, students, adults to the elderly. [22].

Science study program students' learning interest of nutrition higher than other study programs. The science study program curriculum has only one subject related to nutrition which is considered very important to study related to diet and its effect on health. Various new knowledge, such as guidelines for balanced nutrition as a reference for implementing a healthy life. The four pillars of balanced nutrition are 1) consuming a variety of foods, 2) getting used to clean living habits, 3) doing physical activity and 4) monitoring weight regularly to maintain normal body weight [23]. Selection of the right food, enough, not excessive, and balanced is the key to a healthy body. Adequate nutritional intake is able to maintain and improve body health, even reducing the risk of certain diseases [24].

The learning environment owned by the four study programs is in almost the same condition, both in terms of learning facilities and infrastructure, as well as media, visual aids and learning resources. The learning environment supports all students learning activities providing a comfortable atmosphere and encouragement to continue to spur their learning achievements. A good environment needs to be cultivated so that it can have a positive influence on students so that they can learn as well as possible. Conditions that are not optimal from the

learning environment at UNNES include internet connectivity that is not smooth at certain times and at certain places, the lecture room environment that still sounds from outside, and the availability of laboratory equipment. Technical difficulties and poor internet connection are factors that affect online learning [25], [26]. The results of research at other tertiary institutions show the same thing regarding internet connections which is not smooth enough, including the English Language Education Study Program at the Indonesian Technocrat University. [27], majoring in accounting at the East Java National Development University [28], several medical colleges in Jordan [29]. Internet connectivity is very important when learning is carried out online. Online learning needs the support of mobile devices such as smartphones, laptops, computers, tablets and iPhones which are used to access information anywhere and anytime [30]. A number of media are used to support the implementation of online learning. Examples of virtual classes utilize the services of Google Classroom, Edmodo, and Schoology [31], [32], social media such as Facebook and Instagram [33], WhatsApp, Google Drive, and Skype [8]. The availability of laboratory equipment is very necessary for study programs that carry out practicums. Active and interactive laboratory facilities provide hands-on experience [34].

Student nutritional literacy is very concerning, 57.8% in the less category and 40.3% moderate. This shows that students' understanding of nutritional information has not been able to make the right decisions on diet. Nutritional literacy is the ability to understand basic nutritional information needed to make the right nutritional decisions and to predicts adherence to healthy/unhealthy level of nutritional literacy [35]. These results are not much different from a 2020 study which found 58.5% of students had poor nutritional literacy [5]. As many as 29% of Palestinians have adequate nutritional literacy [36], 91.6% of nursing students in Turkey have a moderate level of nutritional literacy [37].

The results of a similar study with women found 76% felt confused about what constituted a healthy diet [38]. Nutritional literacy that still varies among various groups of people shows the importance of nutrition interventions. The importance of nutritional literacy is shown in various research results, including for school children to the elderly, elementary school children [39], adolescents [40], students [41], consumers/community [37]-[43], university academic and administrative staff [44], adult women [45], elderly [46], [47], adults with chronic diseases [4].

The results showed there was a significant relationship between learning interest in nutrition and nutritional literacy. This shows that students who have a higher interest in learning will study longer and learn more than is needed, so that the level of nutritional literacy is higher. This is consistent with research on first-year undergraduate, masters, and doctoral students at four universities in Norway who show a high interest in learning information literacy and make more learning efforts than needed [48]. The importance of nutritional literacy in all age groups or in the human life cycle in a healthy condition, especially in a sick condition, in choosing quality food [4], [35], positively encourages students to learn more.

However, in this study the learning environment had no relationship with nutritional literacy. The condition of the learning environment at UNNES is almost the same in all study programs and the level of nutritional literacy is in the less and moderate categories. This result is different from a study of the learning environment in PG-PAUD FKIP UMS which obtained the result that the learning environment a positive influence to learning achievement [49].

CONCLUSIONS

Learning interest in nutrition and learning environment student at a moderate level. There is a positive relationship between learning interest in nutrition and nutritional literacy with a significance of $0.000 > 0.05$. Differences in learning interest occur among the Natural Science with the Culinary Education, Public Health Sciences, and Nutrition. There are relationships between learning interest and nutritional literacy, and no relationship between the learning environment and nutritional literacy. Based on this research, it is necessary to develop nutritional interventions for students.

AUTHORS' CONTRIBUTIONS

S. Fathonah, reviewed the literature, led the data collection, drafted the manuscript; S. Sarwi, collected data, analysed data, and review the script.

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