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PREFACE

The Seminar under the theme "Turning Dreams into Reality: Current Trends in Mathematics, Science and Computer Science Education" is conducted by Faculty of Mathematics and Science Education, UPI at October 19, 2013. The aim of the seminar is to provide a forum where teachers and researchers can exchange didactical, pedagogical, and epistemological ideas on mathematics, science, and computer science education which is expected to stimulate research in those areas. The seminar also provides an exceptional opportunity for all participants to contribute to the world of mathematics, science, and computer science education.

Some of outstanding scientists and educators from Germany, Australia, Hongkong, Malaysia, Singapore, Netherland, and Indonesia joined in this seminar made the seminar trully international inscope. There were 485 participants, had many fruitful discussions and exchanges that contributed to the success of the seminar. 157 papers discussed in the parallel session. The papers were distributed in 6 fields. 46 papers in mathematics or mathematics education, 19 papers in physics or physics education, 23 papers in chemistry or chemistry education, 25 papers in biology or biology education, 9 papers in computer science or computer science education, and are 18 papers in science education. Of the total number of presented papers, 157 included in this proceeding.

Genereus support for the seminar was provided by SEAMEO QITEP in Science and Himpunan Sarjana dan Pemerhati Pendidikan IPA Indonesia. The support permited us to gave an opportunitiy for a significant number of young scientists and persons from many universities and other institutions brought new perspectives to their fields.

All in all, the seminar was very seccessfull. We expect that these future seminar will be as stimulating as this most recent one was, as indicated by the contribution presented in this proceeding.

Chief of Organizing Committee ,

Dr. Sufyani Prabawanto, M.Ed.

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SCIENCE-TECHNOLOGY-SOCIETY LITERACY AND ADOPTION OF INNOVATION OF STUDENT

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ABSTRACT

A descriptive correlational studied on scienc-technology-society literacy and innovation adoption of students in the population material had been conducted. The purpose of this study to obtain information about science-technology-society literacy in relation to the adoption of innovation in order to repair the population material education. The sample consisted of 35% of the population was taken proportionally included 50 science students, 46 engineering, 63 social in VII semester of a university. The analysis showed that the average literacy of science-technology-society science's student classified as moderate, technique and social as low. TheAdoption of inovation level mean of science's student in the evaluation phase, the engineering in the interst phase, and social in interest-evaluation transition phase. There was a positive correlation between science-technology-society literacy and innovation adoption, the adoption of such innovations need science-technology-society approach.

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1. INTRODUCTION

Population was a part of the environmental subject matter that have many warried issues and need to solved. Population problems include birthrate, mortality, migration, food, clothing, housing, and education. Birthrate is the main base of the population problems. Attention and thinking of scholars, scientists, and educators about it was necessary.

Overcoming the problem of population growth has long pursued through family planning, and is part of the student lecture material, but the extent to which the public or students willing to adopt it is still a question. This essentially involves scientific literacy, technology, society. . Literacy can be defined as the ability to read and write, or communication skills through oral and written. Scientific literacy can be defined as the understanding of science and its application to the needs of the community [14]. Science is a body of knowledge and the process of knowledge discovery [11;5]. Technological literacy can be defined as the ability to implement technology that is based on the ability of identification, be aware of the effects of technology results, and be able to act and be able to use the equipment safely, precisely, efficiently, and effectively [7;8]. Technology is the know how and creative process that they utilize tools, resourcess, and systems, to solve problems, to enhance control over the natural and man- made environment in endeavour to improve the human condition [7;8;14].

Science and technology affect the public welfare. Society can be defined as a group of people living in a particular time and place, which has a view of life, and meet their own needs. The scientific literacy-technology-society can be defined as the ability to solve problems using the concepts of science, technology and know its impact, able to use and maintain technological products, creative make technology products, and is able to make decisions based on value to the welfare of society [7;8].

Science-Technology-Society (STS) is a concept that is intended for learning science through the social issues associated with the technology (Penick, 1985). This educational concept is very concerned about the interaction between conceptual dimensions and processes of science with technology and society [1]. STS concept emphasizes the mastery of a broader science, not only on the acquisition of products and processes of science but olso in relation to technology and society. Population studies related to STS, how strongly the students have an understanding about it, and its relation to the adoption of innovation needs to be disclosed.

Adoption of Innovation is an attitude that involves feeling, thinking, judgment, and decision. Adoption means the acceptance or use of, innovation means renewal. Adoption of innovation is a mental process relating to the making decision to accept or reject a provision, recommendation, or decision. Adoption of innovation does not just happen but through the stages of the process. Innovation adoption may vary, and depend on the knowledge and experience of the individual. Mastery of knowledge contributes to the high and low levels of adoption of innovation [9;4;10].

Both STS and adoption of innovations residence constructed in the minds of students were the result of a learning process in the classroom and on the environment. Learning was a process of processing information from environment that can result in changes in the cognitive, affective, and psychomotor relatively constant, trace and can be measured [3;8,13]. The focus of this research, how was the science-technology-society literacy and the innovation adoption of the students about overcoming the growth of population problems and how its correlation? The purpose of this study was to obtain the information about STS literacy and innovation adoption and its relation, to be used as the basis, especially for the improvement of demographic learning.

2. METHOD

This study used correlational descriptive method. Instruments used include test (objective test) and inventory. The test for gathering STS literacy data. The inventory for capturing innovation adoption data. At the time of the research, the inventories given immediately after charging about STS literacy. The STS data were analyzed and grouped on high (> 74), moderate (55-74), and low (<55). The innovation adoption data were analyzed and grouped into the level of conscious / I (<1.5), interest / II (1.5 to 2.4), evaluation / III (2.5 to 3.4), and adoption / IV (3.5 to 4.0). The STS literacy and the adoption of innovation data then described and correlated.

The population in this study includes students of science, engineering, social, S1 7th semester of a university in Bandung. The sample taken proportionately as much as 35% of the population, covering 50 science students, 46 engineering students, and 63 social students. The student has received the course of population material in the 3rd semesters.

3. RESULT AND ANALISYS

Result

The result of the STS literacy and the innovation adoption data are presented in table 1 and table 2. The result of data correlation presented in the table 3.

Table 1. The Student's STS Literacy Data

Student	n	SD	% X
Science	50	11,00	70,7 (medium)
Engineering	46	11,02	55,2 (low)
Social	63	11,90	52,5 (low)

Ket : n: number of students SD: Deviation standard X: mean

Table 2. The Student's Adoption of Inovation Data

Student	n	Adoption of Innovation									
		I		II		III		IV		X	
		f	%	f	%	F	%	F	%		
Science	50	8	16,0	13	26,0	11	22,0	18	36,0	2,78	III
Engineering	46	12	26,1	15	32,6	8	17,4	11	23,9	2,39	II
Social	63	16	25,4	14	22,2	18	30,2	15	23,8	2,51	II - III

Description:
n: Number of students f: frequency
X: the average value of each phase
I, II, III, IV: The adoption of innovation rate (conscious, interest, evaluation, adoption)

Table 3 The Result of Correlation Between STS Literacy and The Innovation Adoption

Student	Regression equation	Correlation (r)	r^2	p<0,05
Science	Y = 0,189 + 0,037X	0,366	0,134	significant
Engineering	Y = -0,061 + 0,044X	0,437	0,191	significant
Social	Y = 1,705 + 0,015X	0,169	0,029	not significant
Total	Y = 1,065 + 0,025X	0,317	0,101	significant

In general, there is a positive correlation between literacy science-technology-society with the level of innovation adoption

Analysis

The variation of student's STS literacy related to the ability of understanding the concepts and principles of science, analyzed issues related to science and technology society, calculated, considered the arguments, made consideration of relevant information, developed a personal stance against a population problem, especially related to issues of population growth, so in this case involved cognitive aspects: comprehension, application, analysis, synthesis, and evaluation.

The variations in the level of the STS literacy achievement of the students of science, engineering, and social can be caused by several factors. Gagne and Brigs suggested that learning outcomes were influenced by talents; supporting factors such as home, family, community, school; process factors such as teaching and learning in schools; instructional program factors such as curriculum and course materials [2].. These factors differ between groups of students of science, engineering, and social so that the learning results were different.

The process variables such as the teaching and learning, and the weight of the course material were the variables that were very much crucial. The science students got the population material from the lecture of the basic social science (ISD / 2 credits) and from the coursed of the knowledge of the environment (3 credits). The students of engineering got the population material from the lecture of basic social demographic (2 credits). The social student received the population material from the lecture of Basic Natural Sciences (IAD / 2 credits). The lecture of the population in the IAD or ISD involved demographic problems, birthrate, mortality, migration, and family planning. The students of science recived also the material of reproduction from the General Biology (2 credits). The primacy of STS literacy of the science student can be caused due to the strong background in science, and many obtained science material.

The high STS litersacy might contributed to the high rate of adoption of innovation. There was a significant positive correlation between the STS literacy and the innovation adoption. That's shown in the data of the science students (r = 0.366, contribution: 13.4%), Student of engineering (r = 0.437, contribution: 19.1%), the students combination (r = 0.317; contribution: 10.1%). Although the correlation was not significant in the social student data (r = 0.169; contribution : 2.9%), but it was still have a positive correlation, so in general, the higher STS literacy the higher the adoption of innovation.

The adoption of innovation of the students of science, engineering, and social about overcoming the population growth were varies from conscious stage to adption stage. The adoption rate of the student of science was at the evaluation stage (stage III), the students of engineering was at the interest stage (II), and the social student were in the transition between interests and evaluation. These data indicate that the adoption of innovation of the students of science was higher than engineering and social. The adoption inovation of social students was slightly higher than engineering.

The high adoption of innovation due to higher understanding of innovation. In this case, innovation related to science-technology-society of population. The population course include the demography, and the tools and methods of family planning. The students of science had a relatively strong base of it. They got the material from the course of the environmental knowledge, the general biology, the mbryology, and a little bit from ISD. The innovation adoption of social students supported by the Basic Natural Science and might be from social science that they studed. In fact, the understanding of science was more decisive than the social aspects. The low innovation adoption of engineering students due to lack of adequate understanding of the science-technology-society of that innovations. They did not get the natural basic science course. Basic social sciences they earned was not enough to increase the adoption of innovation. Science supplies they have come from high school earlier.

Adoption of innovation was an integrated picture of the feelings, interests, thoughts, and consideration given by a person to anything problem or issue, or something duties. Adoption of innovation of some one developes through certain stages. Every stages can be measured. The adoption rate varies among individuals, in accordance with their respective experiences. The adoption level of

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innovation in this research include phase/stage of conscious, interest, evaluation, and adoption [9]. Awareness phase, a first stage of the individual to know or learn about something innovations. Interest phase, a second phase begin to develop the information obtained to arise and develop a passion for reviewing more on innovation. The evaluation phase, individuals have the information and evidence that relatively more about an innovation, thus providing an important consideration whether an innovation. The adoption phase, the individual has had incomplete information and evidence about an innovation that believes that innovation has learned both to be accepted [9].

4. CONCLUSION

The science-technology-society literacy and the adoption of innovation of someone were varied. The Student of science had a moderate STS literacy , relatively high in adoption rate (in the evaluation phase). The Student of engineering had low STs literacy , and low in the adoption of innovation (in the interest phase). The Social student had low STS literacy, relatively low adoption of innovation (transition between interest and evaluation phase).

There were the significant positive correlation ($\alpha = 0.05$) between the level of the STS literacy and the adoption of innovation. The higher STS literacy, the higher the rate of adoption of innovation. Its implications, teaching population should not only give understanding about demography but olso needs to introduce its innovations and use the STS approach.

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