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The Impact of Project-Based Collaborative and Participatory Learning Models on Student Achievement and Recognition Faculty of Computer Science Narotama University

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ABSTRACT

Purpose: This study aims to determine the influence of project-based collaborative and participatory learning on student achievement and recognition, especially at the Faculty of Computer Science, University of Narotama (Unnar).

Design/methodology/approach: The model is carried out by involving the Information Systems and Informatics Engineering Study Program. It analyzes the relationship between the variables associated with the learning model.

Findings: The results showed a significant effect of collaborative and participatory learning on educational accomplishments and understanding.

Originality/value: This paper is original

Paper type: Research paper

Keywords: *Academic Achievement, Learning, Participatory Learning, Project-Based Learning, Recognition.*

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I. INTRODUCTION

The Faculty of Computer Science at Narotama University consists of three study programs: information systems, computer systems, and informatics engineering. It has the vision to become a modern and quality faculty based on information and communication technology by 2025. Its mission is 1) Ensuring the best process to produce graduates who have high integrity and nationalism, independence, cooperation, professionalism, and capability to create and develop business applied by using information technology, 2) Become an agent of change in research and development of information technology, 3) Become the leading partner of MSMEs in developing appropriate technology systems through counselling, training, and coaching, 4) Making graduates who are competitive and entrepreneurial. The MBKM program is an adaptive and innovative learning model that requires students and lecturers to collaborate flexibly. It is expected that it will impact student achievement intellectually and perception. By involving two Study Programs at the Faculty of Computer Science, namely the Information Systems Study Program and Informatics Engineering, it is hoped that students can learn together in a dynamic team. The project-based learning model makes it easy for students from different study programs to know actual practice. There is a database design, concept, and information system

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design in the curriculum of the Information Study Program and web and mobile programming in the Informatics Engineering Study Program (Guo et al., 2020).

II. LITERATURE REVIEW

A. Collaborative Learning

It is a process with various ability levels working together for a common goal. Opportunities for its implementation today are certainly very wide open because the infrastructure and ICT networks in various universities are generally better prepared than ten years ago—likewise, lecturer readiness in developing innovative learning models. Compared to competitive and individualistic efforts, this type of learning provides social benefits by creating a relationship support system that is more caring, supportive, and committed in a positive atmosphere. In the end, it will contribute to psychological health and social competence to develop self-esteem in the learning community (Strauß & Rummel, 2020).

B. Participatory Learning

It is a model that involves students planning, implementing, and evaluating learning. It requires them to be more active in the learning process to produce innovation and creativity. MBKM is very relevant to this learning model because students must be more adaptive and innovative. With this model, students are more proficient in communication, produce real work, and improve student accomplishments academically and cognitively (Arbarini et al., 2018).

C. Project-Based Learning

It is one method that uses the project as a medium of learning. In this way, students are expected to be able to explore. They are involved in planning and designing tasks within the scheduled timeframe. So, students can think critically and enhance problem-solving skills, which at the same time acquire technical skills. This model will produce various learning outcomes (Ummah et al., 2019).

D. Academic Achievement

It is a learning process that results in knowledge, understanding, application, analysis, synthesis, and evaluation changes. The achievement of each student is not the same. It is caused by several factors, both internal and external. Internal factors that impact students' learning achievement are psychology and physiology. Psychology includes intelligence, learning motivation, attitudes, interests, feelings, and social, cultural, and economic conditions. Physiology covers physical health, biological individuality, mental condition, and personality development. External factors that influence are a) the learning process on campus, including learning facilities, discipline, learning curriculum, and grouping of students; b) social, including the social status of students, the school system, interaction between lecturers and students and students with students; (c) situational, including the politics of place and time. The measure of student academic achievement is also determined from the value of the Achievement Index. Of course, students expect high grades so that the industry can recognize the credibility of their graduation (McCullough, 2012).

E. Recognition

It is a student achievement at a higher education institution, given by communities, organizations, and government. It is also awarded to universities in managing student activities. Of course, recognition must be given to active and registered members in the DIKTI Database. Some of the achievements recognized in the student rankings include 1) publication of patents, Intellectual Property Rights (HAKI), and book publications, 2) being a jury in national and international scale activities, 3) being a speaker at conferences or seminars on a national and international scale.

1. Data Collection

The data collected is data from the results of filling out questionnaires for 420 students of the Faculty of Computer Science who have participated in the MBKM program, with semester 3 being the lowest semester (57%), semester 5 (22%), and the highest semester was semester 7 (21%).

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	Propins	Perguruan Tinggi	Program Studi	Identitas	Nama	Semester	Pertanyaan
235	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04118009	I MADE AGUS CHANDRA WIJAYA	7	Apabila Saudara diminta memilih dari 8 (delapan) ber
236	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04118005	EKKY ERLANGGA	7	Apabila Saudara diminta memilih dari 8 (delapan) ber
237	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04118004	MOCHAMAD RIZKY ALFATEH	7	Apabila Saudara diminta memilih dari 8 (delapan) ber
238	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04118002	MUHAMMAD FARID ANDY THREE ANSYAH	7	Apabila Saudara diminta memilih dari 8 (delapan) ber
239	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04118001	RIDO BAGUS JULIONO	7	Apabila Saudara diminta memilih dari 8 (delapan) ber
240	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04117018	MUCH MIFTACHUR ROHMAN	9	Apabila Saudara diminta memilih dari 8 (delapan) ber
241	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04117010	RIZHAN CAHYA RAHMADAN	9	Apabila Saudara diminta memilih dari 8 (delapan) ber
242	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04117004	YUDHISTIRA ILHAM TAMAMI	9	Apabila Saudara diminta memilih dari 8 (delapan) ber
243	Prov. Jawa	Universitas Narotama	S1-Sistem Komputer	04116020	ANITA SELVIANA LUNA	11	Apabila Saudara diminta memilih dari 8 (delapan) ber
244	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319064	MOH. FAUZAN	5	Apabila Saudara diminta memilih dari 8 (delapan) ber
245	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319061	ICHA ILFANY HIDAYAT	5	Apabila Saudara diminta memilih dari 8 (delapan) ber
246	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319058	MUHAMMAD RIZKY RAHMATTULLAH	5	Apabila Saudara diminta memilih dari 8 (delapan) ber
247	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319054	NAUFAL ANUGRAH RAMADANI	5	Apabila Saudara diminta memilih dari 8 (delapan) ber
248	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04318048	HISYAM FAJARI ARDANI	7	Apabila Saudara diminta memilih dari 8 (delapan) ber
249	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319051	ADAM OMAR ALI ABDELHAFEZ	5	Apabila Saudara diminta memilih dari 8 (delapan) ber
250	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319047	ALA ADEL HAMOOD NAJI AL-ASKARY	5	Apabila Saudara diminta memilih dari 8 (delapan) ber
251	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319043	AHMED MOHAMMED ABDULLAH AL-HEBSHI	5	Apabila Saudara diminta memilih dari 8 (delapan) ber
252	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04318028	MUHTAR EFENDY	7	Apabila Saudara diminta memilih dari 8 (delapan) ber
253	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04318024	YOHANES PAUL ASWIN NAPANG	7	Apabila Saudara diminta memilih dari 8 (delapan) ber
254	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319038	FAISAL HAMZAH FAISAL AL AHDAL	5	Apabila Saudara diminta memilih dari 8 (delapan) ber
255	Prov. Jawa	Universitas Narotama	S1-Teknik Informatika	04319036	SINDY DWI LESTARI	5	Apabila Saudara diminta memilih dari 8 (delapan) ber

Figure 1. Data Collection

III. METHODOLOGY

Research activities cannot be separated from a design to be right on target and effective. Several stages in the methodology of research activities are designed in a structured manner. Each passing stage must wait for the previous stage to finish and run sequentially. The following is a research methodology flowchart:

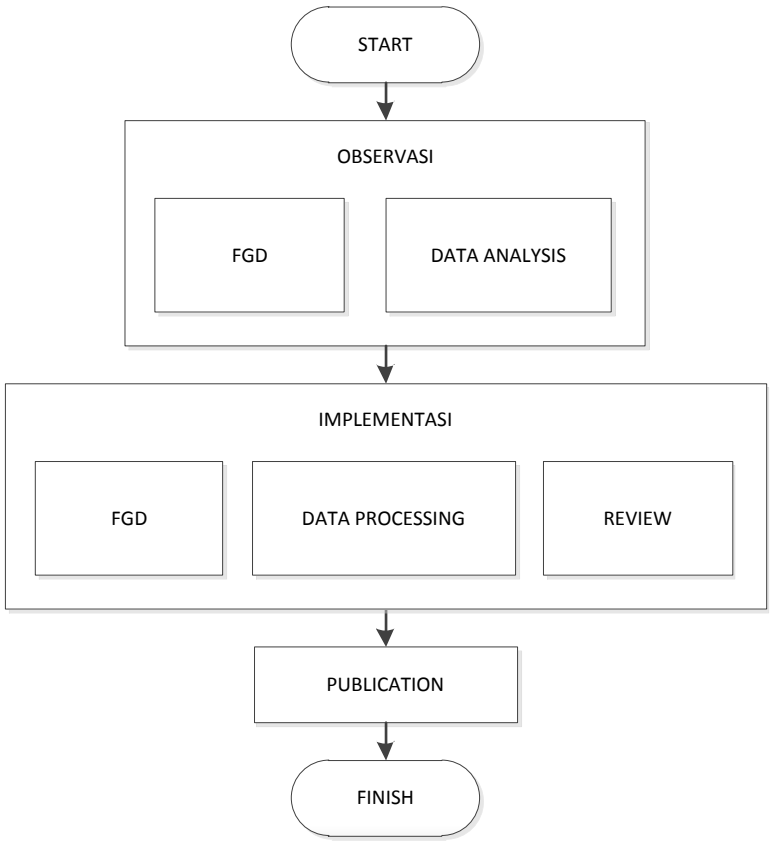

Figure 2. Flowchart Methodology

The initial step starts from the observation stage by conducting a Focus Group Discussion (FGD). It is attended by lecturers of the Information Systems Study Program and several lecturers from other study programs, especially the Faculty of Computer Science and senior lecturers with research expert competencies. The aim is to establish an initial framework to structure and carry out activities (Muijeen et al., 2020). Next is the process of analyzing the data from the questionnaire survey results within the faculty on the

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http://survey.spadadikti.id page. The next step is to implement the results of the observation activities, starting with the second phase of the Focus Group Discussion (FGD) activity, the topic of which is data processing. The next step is to process data on the scope of the faculty to obtain several variables that affect collaborative and participatory learning activities on a project-based basis. After the data is generated, the next step is to review the current results and publish them.

IV. RESULTS

The final results of the above research methodology activities were obtained by analyzing various answers to questionnaires related to collaborative learning. Some questions are grouped, including numbers 1, 8, 16 and 19. Question number 1 is to analyze the understanding of MBKM collaborative learning. The question is: How much do you know about the MBKM policy? The answer consists of not knowing at all, knowing most of the content, and knowing little. Question 8 is: If you were asked to choose from eight learning activities outside your study program, which one would you choose? The answers are entrepreneurial activities, internships/work practices, village building or thematic actual work lectures, research, student exchanges, humanitarian projects, independent studies/projects. Question number 16: In your opinion, has an increase in soft skills been obtained after MBKM in developing competence/skills to prepare for work after graduation? The answer is that the improvement is quite good, a good improvement, an outstanding improvement, there is an improvement but not good enough, and no improvement at all. Question number 19: In your opinion, does MBKM suit the needs of future graduates? The available answers are very appropriate and appropriate. The four questions above are correlated with project-based collaborative and participatory learning.

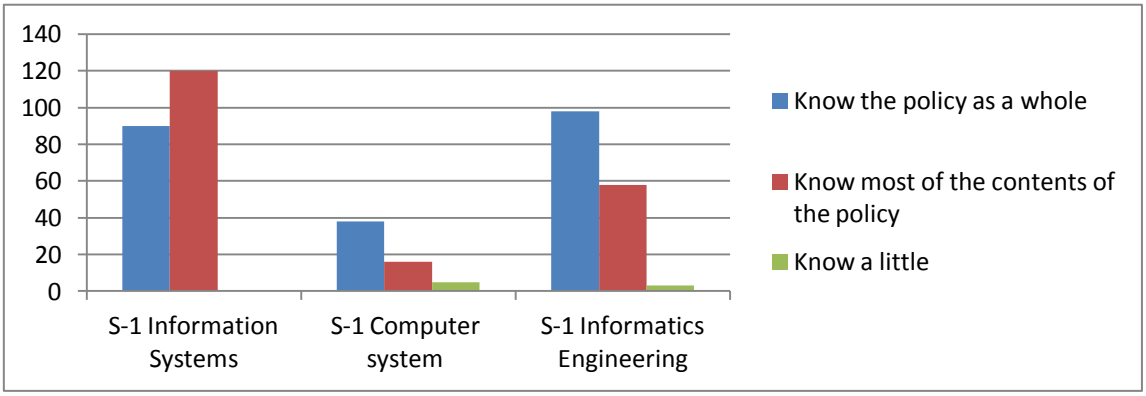

Figure 3. The impact of A variable

The picture above explains question number 1 to determine students' understanding of the MBKM policy. It will later be entered in variable A with 420 data. The answer who knows the overall policy (A1) is 222. It comes from the Information Systems Study Program 87, Computer System 38 and Informatics Engineering 97. Then proceed with the answer knowing most of its contents (A2) totals 195. It consists of Information Systems Study Program 121, Computer Systems 16, and Informatics Engineering 58. Lastly, the answers to know a little (A3) total 3, Information Systems Study Program 0, Computer Systems 2, and Informatics Engineering of 1. Conclusion: the influential variable is the variable A1.

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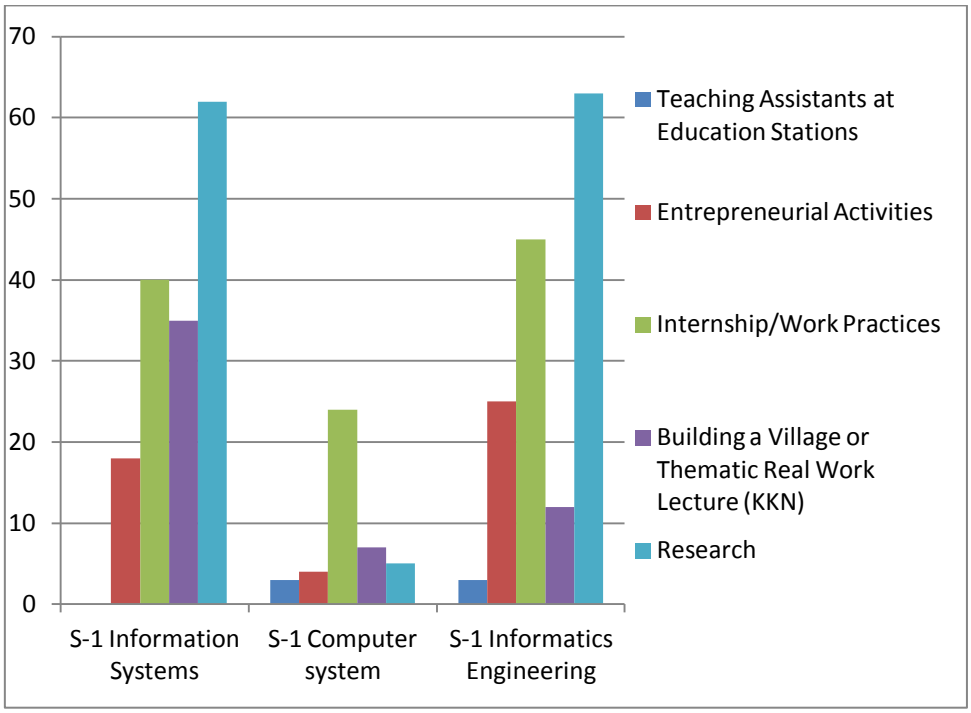

Figure 4. The influence of B Variable

The picture above describes question number 8 and is a question to determine student interest in MBKM. It will later be entered in variable B with a total data of 420. Teaching assistance (B1) answers are 2, Information Systems Study Program 0, Computer Systems 1, and Informatics Engineering 1. Then the answers to entrepreneurial activities (B2) are 19, consisting of Program Information Systems Studies 19, Computer Systems 2, and Informatics Engineering 25. Then the answers to internships/work practices (B3) are 107, Information Systems Study Programs are 40, Computer Systems are 23, and Informatics Engineering is 44. The answers to build villages/thematic KKN (B4) totalling 53, consisting of 35 Information Systems Study Programs, 6 Computer Systems, and 12 Informatics Engineering. Research answers (B5) amounted to 128, Information Systems Study Programs 62, Computer Systems 3, and Informatics Engineering 63. Student exchange answers (B6) are 17, Information Systems Study Program 11, Computer Systems Study Program 6, and Informatics Engineering are 0. Then the humanitarian project answers (B7) are 29, Information Systems Study Program 18, Computer System 3 and Informatics Engineering are 9. Finally, the answers to independent studies/projects (B8) are 38, Information Systems Study Program 2, Computer Systems 12, and Informatics Engineering are 3. So the significant value is variable B5, namely research (Strijbos & Fischer, 2007).

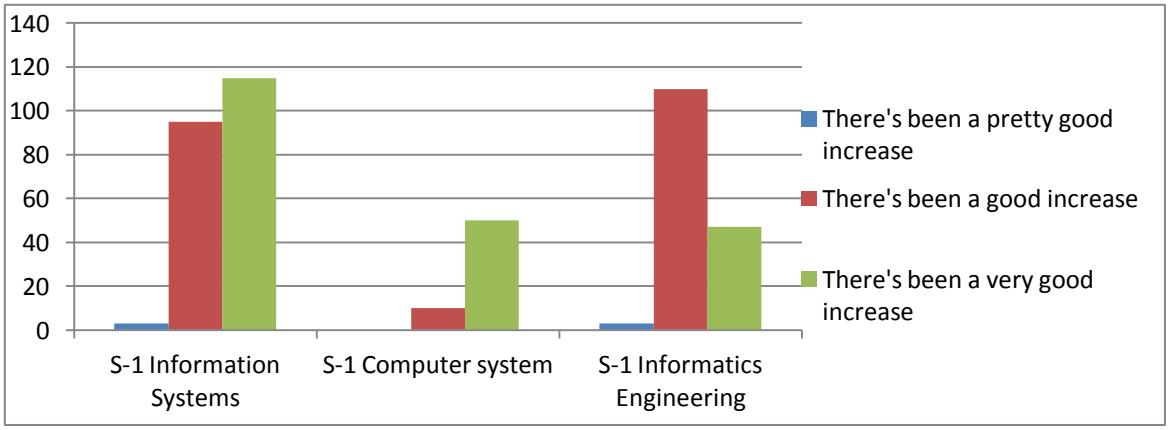

Figure 5. The effect of C Variable

The picture above depicts question number 16. The types of questions to find out the benefits of MBKM for improving soft student skills in programs that have been implemented now and after participating in MBKM.

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The question will later be entered in variable C with a total data of 420. The answer of there is a reasonably good increase (C1) number 2, which consists of Information Systems Study Program 1, Computer Systems 0, and Informatics Engineering 1. Then the answers have a moderate increase (C2) amounted to 210, Information Systems Study Program 93, Computer Systems 8 and Informatics Engineering 109. Then, the answers were a tremendous increase (C3) totalled 208, which consisted of Information Systems Study Program 114, Computer Systems 48, and Informatics Engineering 46. The most dominant variable is the C3, which is an outstanding improvement.

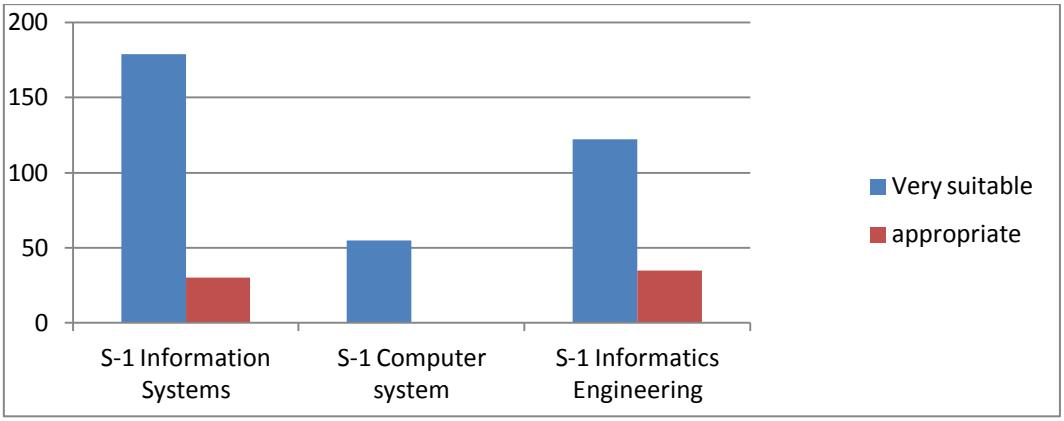

Figure 6. The effect of D Variable

The picture above is a description of question number 19 with the types of questions to find out how to help develop MBKM in higher education following the needs of future graduates. It will later be entered in variable D with a total data of 420. The answers of very appropriate (D1) are 356, Information Systems Study Program 176, Computer Systems 56, and Informatics Engineering 122. The answer of appropriate (D2) is 64, Information Systems Study Program 30, Computer Systems Study Program 0, and Informatics Engineering Study Program 34. So the most influential variable is the D1 variable, which is very appropriate.

V. CONCLUSIONS

The following data is the data from filling out the questionnaire with the highest total value or frequency according to the grouping of variable names (Elliott et al., 2006).

Table 1. Results and Conclusions

No.	*Variable Name*	*Frequency*
1.	*A1 (Knowing Most Policies)*	*222*
2.	*B5(Research)*	*128*
3.	*C3 (Excellent Upgrade)*	*208*
4.	*D1 (Very Appropriate)*	*356*

It can be concluded that collaborative learning activities at the Faculty of Computer Science have a good impact. It is evidenced by the percentage level of student answers that have a positive effect, including 1) students' understanding of MBKM learning, the majority of which know the whole, 2) the form of MBKM learning activities that are of interest to is research which correlates with project-based learning, 3) there is an increase in soft skills and development of excellent competencies or skills, 4) The suitability of MBKM activities for higher education with the needs of future graduates, especially the Faculty of Computer Science.

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