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Discrepancy Models Evaluation (DEM) in Physics Based Learning Project (PjBL) of Student Entreprenurship Character

Sri Jumini
Universitas Sains Al-Qur'an, Indonesia
srijumini@unsiq.ac.id

Ani Rusilowati
Universitas Negeri Semarang, Indonesia
rusilowati@yahoo.com

Sutikno
Universitas Negeri Semarang, Indonesia
sutiknomadnasri@mail.unnes.ac.id

Edy Cahyono
Universitas Negeri Semarang
Indonesia
edkim@mail.unnes.ac.id

Parmin
Universitas Negeri Semarang
Indonesia
parmin@mail.unnes.ac.id

Firdaus
Universitas Negeri Semarang
Indonesia
Firdaus.24@gmail.com

***Abstract*---Discrepancy Evaluation Models of Information Technology-based Project Assignment Programs in learning Physics are conducted to see whether there are gaps, so that the effectiveness of the program can be continued or not. The evaluation technique is carried out by conducting interviews with supporting lecturers, observing lecture processes, and questionnaires to supporting lecturers and students. The results showed that: (1) Information technology-based Project assignment program in learning Physics was carried out well with a score of 3, 70. (2) The program can be done by giving students assignments by making applied physics products that can be utilized in everyday life, then presented to see the truth of the physical concept and the clarity of the product made, then students upload the video to YouTube to see the market response; (3) Information technology-based project assignment programs in physics learning provide a clear picture of how physics works in the community. The integration of Economi of Science, entrepreneurship, Nature of Science can better provide a clear picture of how Physics works in society. Thus this program can be continued by revising several existing stages.**

Keywords: Physics Project, economi of science, entrepreneurship

I. INTRODUCTION

The Ministry of Education and Culture policy in learning requires entrepreneurial content [1]. Entrepreneurship considers as the main engine of economic growth and development [2]. Learning is more directed at developing individuals according to their interests and talents, as well as their intelligence [3]. Students need to be given the freedom to speak with maximum expression, and given the freedom to be made. Thus the ability and intelligence will develop according to their respective interests and talents. Student creativity is channeled to positive things in the form of real work. The spirit of learning physics is a product, process, and scientific attitude. Physics Learning is a process of discovery that invites students to gain direct experience, have the ability to think in solving problems, cooperate, and innovate [4].

The spirit of physics learning is the basic foundation in learning the method of learning, and whatever the medium. Physics learning based on discovery makes it possible to develop entrepreneurship skills (entrepreneurial spirit). Entrepreneurial skills direct students to hone their ability to see opportunities, initiate and innovate, dare to take risks [5], [6], [7]. The entrepreneurial spirit will not only form students able to innovate and see job opportunities, but will also be able to create jobs, so as to overcome national problems related to educated unemployment resulting from bachelor and diploma graduates. The university has produced thousands of bachelor and diploma graduates. Most of these graduates are waiting to be accepted to work in certain institutions with thousands of competition [8]. The Central Statistics Agency (BPS) in 2019 shows that the number of unemployed people in Indonesia rose by around 25% in 2019 [9]. February 2016 there were 7.02 million people or 5.5 percent, August 2016 was 7.03 million people or 5.61 percent, and lastly in February 2017 there were 6.68 million people or 5.33 percent, in February 2018 there were 688,660 people or 9.5 percent.

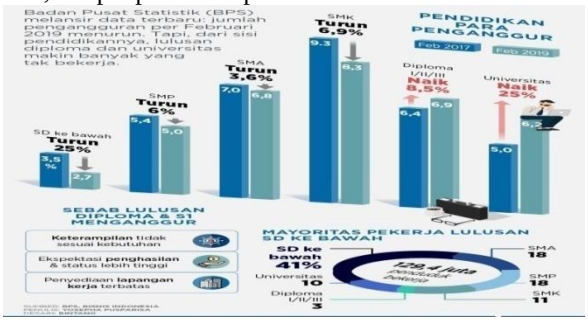

Figure 1. Indonesian Unemployment Data for 2019

Physics learning must be directed at the maximum formation of scientific attitudes. Students are directed at the application of physics concepts in real projects in the community, and need to be facilitated with concepts and skills that lead to the formation of entrepreneurship skills [10]. It aims to inspire students, arouse their emotions, and change their mindset [11], [12]. This mindset will shape the student's personality not to wait for work, but to always take advantage of his time to always work, and feel loss if time passes in vain.

Project-based physics learning trains students to apply the concepts obtained to make prototype applications in the community. The manufacture of applied physics products trains students to innovate and be creative. Giving loose time can give students the opportunity to work. Curiosity and curiosity motivate students to complete their products. Students are also directed to think in terms of the benefits of the products they make in the community. Thus entrepreneurship skills will be trained. Project-based physics learning integrated with sciencetecnopreneurship trains students to be actively involved in observing, trying, and communicating, as well as creatively in producing products based on physics concepts that have been studied [13] [14], [15], [16], [17]. Learning physics becomes more fun, and the application becomes clearer. Not just impressed mathematically and count alone.

The spirit of physics learning emphasizes more on products, processes, and scientific attitudes [18]. Products in the form of facts, principles, laws, concepts, theories. The process of learning physics is done scientifically through inquiry, so that this process will form a scientific attitude that is 1) curiosity, 2) honest, 3) diligent / persevering, 4) thorough, 5) open, 6) critical, 7) optimistic, 8) care for the environment, 9) can work together, 10) responsible. In order to be able to contribute to providing solutions to the problem of educated unemployment, physics learning is directed at the formation of creativity, and entrepreneurship skills, namely the ability to innovate, see opportunities, and take advantage of opportunities to benefit.

For this reason, physics learning innovation has been pursued to explore and develop student creativity by providing programs in the form of assignment of information technology-based projects in physics learning. This task is in the form of making applied products from the application of physics concepts that have been obtained. Then the task is presented in class to see whether there is a concept error or not. After that students prepare flogs to be uploaded on YouTube. The program is expected to train students' skills to innovate, be smart at opportunities, and take advantage of opportunities to exist in social media or even increase income. To see the effectiveness of this program an evaluation of the program is carried out using the Discrepancy. This study aims to: (1) Know how Project assignments based on information technology in learning Physics; (2) Knowing the success of Information technology-based Project assignment program in learning Physics for Student Entrepreneurship skills; (3) Knowing the effectiveness of information technology-based project assignment programs in learning Physics with the Discrepancy Evaluation Model (DEM).

II. METHODS

This research was conducted at the Physics Education Study Program of UNSIQ's FITK Physics and Civil Engineering Study Program of UNSIQ Central Java in Wonosobo, specifically semester 1 of 155 students. The evaluation of this program was carried out from the beginning of the assignment of information technology-based projects in physics learning to the assessment, namely November the second Sunday to December the first Sunday. Retrieval of data in the implementation of project evaluation based on information technology project assignments in Physics learning is carried out with several Techniques, namely: 1) Interviews, interviews are conducted with supporting lecturers and Head of Study programs related to several things including: Lecturers' perceptions in learning activities and lecturer actualization in improving the quality of learning; Planning, implementing, and evaluating lectures in Basic Physics and Engineering Physics; Student interest in lectures in Basic Physics and Engineering Physics, level of confidence, activities in lectures, and student responses to lectures; Availability and utilization of facilities and infrastructure, as well as learning environment facilities used so far. 2) Observation, Observation is carried out to lecturers and students while learning is taking place, and observations are made on products made by students and uploaded on Youtob. 3) Questionnaire, Questionnaire used in the evaluation of information technology-based project assignment programs in Physics learning is used to obtain data on: lecturers' perceptions related to lectures on Basic Physics courses; Self-actualization of lecturers in improving the quality of lectures; planning, implementing, and evaluating learning in Physics courses; Student interest in physics lectures; student's level of confidence; Student activities in attending lectures; student responses to information technology-based project assignment programs in physics learning; availability and utilization of facilities and learning environment facilities.

The evaluation of this program uses the Discrepancy (DEM) model. Discrepancy Evaluation Model (DEM) was developed by Malcolm Provous [19], which aims to evaluate whether a program will be revised, continued, or continued. The program evaluation that will be carried out here is to look at

physics learning programs by assigning information technology-based projects to improve student entrepreneurship skills. This evaluation is done by describing the program, and how to implement it, and see its achievements. This Discrepancy Evaluation Model (DEM) is carried out in the following stages. a) design At this stage the objectives, processes and activities of the Information Technology-based Project assignment program are defined in Physics learning, and detail the resources needed to implement the program. The standards formulated in this stage form the basis for further decisions. b) Installation Program implementation standards are formulated in the first stage as a basis for evaluating the programs that are run. The evaluation here is carried out with a series of activities to see the differences/gaps of the program planned with implementation in the field. This stage aims to ascertain whether the program runs according to the objectives or not. c) Process The stage of the process is carried out by collecting data regarding the implementation of an information technology-based Project assignment program in learning Physics to determine the initial impacts, influences, and effects. This data collection is done by survey technique. The survey was conducted by interviewing lecturers, and distributing questionnaires to students taking physics courses. d) Product At this stage an analysis of the data that has been obtained to see the achievements of the program. Evaluators compare factual achievements with the standards set at the first stage. This is used to formulate long-term follow-up.

III. RESULT AND DISCUSSION

This Discrepancy evaluation model is carried out to see whether there are gaps in the information technology-based project assignment program in learning Basic Physics and Engineering Physics in the S1 Physics Education Program and the S1 Civil Engineering Program. Program evaluation with this discrepancy model follows the stages developed by Pravous as follows.

DESIGN

At this stage, the objectives, processes and activities of the Information Technology-based Project assignment program are defined in Physics learning as follows. 1) Purpose The purpose of the Information Technology-based Project assignment program in learning Physics is adjusted to the curriculum of the Study Program based on KKNI in the form of Course Learning Outcomes (CPMK). For the assignment of information technology-based Project assignments in physics learning does not take the whole CPMK, but only partially taken accordingly as follows: (a) Students are able to understand and analyze physical phenomena in nature, especially about motion (mechanics) and simple cases of the principle balance in daily life; (b) Students are able to carry out project assignments to see the application of applied physics concepts in daily life; (c) Students are able to arrange the relationship between physics courses with various businesses (entrepreneurship); (d) Students have innovation and creativity, and entrepreneurial skills in carrying out physics learning project tasks based on technology development. 2) Process To realize the goals set out in the CPMK a learning process is carried out, and assignments are made to make applied physics applications in daily life. This activity is carried out for 2 months to be assessed as one of the college assignments. 3) Activities In this activity the lecturer gives initial instructions about the assignment, makes an agreement about the assessment and project schedule. Students complete assignments, present and be evaluated by lecturers and other students. Then after the product is revised based on the input of lecturers and students, the product is packaged well, made vlogs and uploaded to YouTube.

The next assessment of the uploaded product is how many likes and comments. Some of the products that have been uploaded can be accessed at the following address. The resources needed in this program besides lecturers and students are infrastructure and infrastructure that support the smooth running and implementation of the program, namely, the equipment of each product and supporting equipment that can be obtained by students in the physics laboratory. Then internet, wifi and video editing are used by students to make vlogs.

Tabel 1. Web address of student work products

https://youtu.be/XE6vbq5Lj-A	https://youtu.be/tdJrVteQSEY
https://youtu.be/BKBa4yUhP9E	https://youtu.be/s3tr_qqOyWQ
https://youtu.be/FyocXQTBtUU	https://youtu.be/ykZRJXikrJM
https://youtu.be/JIBLMRyeZ8o	https://youtu.be/EIWxaJc4mgA
https://youtu.be/97WOyKz9i_c	https://youtu.be/n898N-hYHqo
https://youtu.be/wmUFBzuV6r8	https://youtu.be/vwapWXbjMwo
https://youtu.be/cijAoekRCuY	https://youtu.be/0-0U2cLKcOk
https://youtu.be/HCPvd9C5kJI	https://youtu.be/aD5CDqXCFF0
https://youtu.be/g49mZWM2hKk	https://youtu.be/9J1DYeu29og
https://youtu.be/uu3DmrOwL0U	https://youtu.be/68jSxz8Gsw4
https://youtu.be/rgbNChpDVnE	https://youtu.be/0umOBrG20h0
https://youtu.be/9VQuznh1zqc	

INSTALLATION

Tools needed in the evaluation of the Information Technology-based Project assignment program in learning Physics are: (1) Guidelines for interviews conducted with officials and supervisors to see the objectives and processes of the program; (2) Questionnaire is directly open to see instructors in implementing information technology-based Project assignments in Physics learning; (3) Closed questionnaire to see students' responses and activities

to the Information Technology-based Project assignment program in Physics learning.

PROCESS

The process phase is carried out by involving data about the implementation of an information technology-based Project assignment program in learning Physics to determine the initial objectives, effects, and effects. This data collection was carried out by an Engineering survey. The survey was conducted by interviewing lecturers, and distributing questionnaires to students taking physics courses. The questionnaire.

Tabel 1. Web address of student work products

No.	Quenstion	Amount	Score	Category
1.	You have a high interest in Basic Physics/Engineering Physics courses	498	3.8	agree
2.	You have a reference book for Basic Physics/Engineering Physics courses	438	3.34	doubtful
3.	You always prepare well, and read the material when visiting will carry out lectures in the subject of Basic Physics/Engineering Physics	444	3.39	agree
4.	You have high confidence to be able to attend lectures in Basic Physics / Engineering Physics	509	3.89	agree
5.	You are not very confident about completing basic Physics / Engineering Physics courses	399	3.05	doubtful
6.	You pay close attention to what lecturers deliver in lectures	517	3.95	agree
7.	You are happy with the lecturer assignments that hone more students' talents, intelligence, and creativity	517	3.95	agree
8.	You prefer assignments in the form of manufacturing products to working on problems	521	3.98	agree
9.	Learning is done by explaining the theory of Basic Physics / Engineering Physics courses	505	3.85	agree
10.	Learning is done by observing in markets and in industries related to applied products of Basic Physics/ Engineering Physics courses in everyday life	518	3.95	agree
11.	Learning by using information and communication technology is not effective in developing students' talents, intelligence, and creativity.	409	3.12	agree
12.	Field observations provide a good stimulus to foster student talent, intelligence, and creativity	563	4.3	verry agree
13.	Learning with lectures, field observations, and the use of ICT can develop students' talent, intelligence, and creativity	526	4.02	agree
14.	Making applied physics products as UTS and UAS bills can foster a spirit of entrepreneurship	516	3.94	agree
15.	Basic Physics / Engineering Physics learning needs to be integrated into each subject so that entrepreneurial skills are massively owned by students	502	3.83	agree
16.	Physics learning needs to be combined with technopreneurship so physics is not only theoretical and simple calculations, but is able to show its application in everyday life.	558	4.3	Very agree
17.	Learning physics is enough to foster scientific attitudes only, there is no need to develop entrepreneurship skills	349	2.7	doubtful
18.	Facilities and facilities for lectures are sufficient to integrate physics, technology, and entrepreneurship learning	426	3.3	agree
Average Skor			3.70	

Classification of student responses to the Information Technology-based Project assignment program in physics learning is determined as follows: this instrument has 18 questions / statements with a minimum score of 1, and a maximum score of 5. So that the answer from a respondent has a minimum value of 1x18 = 18, and a maximum value 5x18 = 90, the class interval is (90-18) / 5 = 14.4. The instrument was distributed to 131 respondents. Then the number of answers from 131 respondents has a minimum value of 131x18 = 2358, and a maximum value of 131x90 = 11790, then the interval interval (11790-2358)/5 = 1886.

Table 3. Program evaluation results

Total Score	Average Score	Rating Classification
75,8 – 90,1	4,3 – 5,0	Very good
61,3 – 75,7	3,5 – 4,2	good
48,9 – 61,2	2,7 – 3,4	Prety good
32,5 – 48,8	1,9 – 2,6	Not god
18,0 – 32,4	1,0 – 1,8	Veri unkind

Assessment of information technology-based project assignment programs in learning Basic Physics and Engineering Physics in the Physics Education S1 Program and the Civil Engineering S1 Program based on student response questionnaire in good category with a value of 3.70. From table 2 it can be explained that the majority of students, 65.2% agree that students have a high interest in physics lectures, Fg. 1.

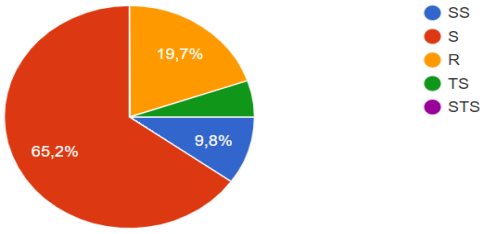

Figure 1. Interest in lectures in Physics

Around 40,2% of students are hesitant to have lecture reference. Fg. 2. Even though their interest in learning is high. This is possible because there are other obstacles which become obstacles to have college references. It could be financial factors or maybe other factors such as the distance from the book publisher.

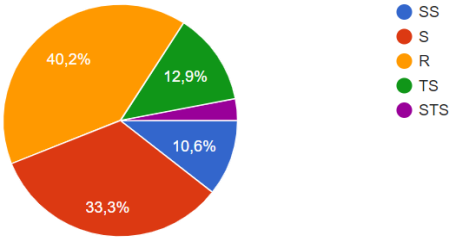

Figure 2. Ownership of college references

Figure 3 shows that students agree that the manufacture of applied physics products can improve the entrepreneurial spirit and scientific attitude of students. However, they lack confidence in completing their tasks, figure 4. The observations of educators provide a lot of motivation to overcome the

lack of self-confidence of students, so the task can be completed properly. On the other hand students agree that product development is more honing their interests, talents, and skills, as well as student creativity. Students are also more happy because learning does not seem theoretical and mathematical calculations, more related to real life. Students are also as determined that the use of technology in learning and completing assignments makes lectures more interesting.

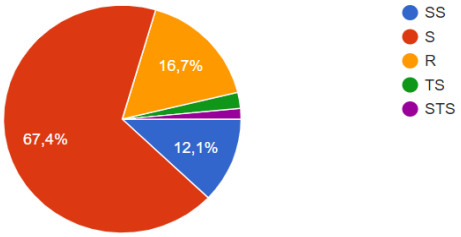

Figure. 3 Product manufacturing response

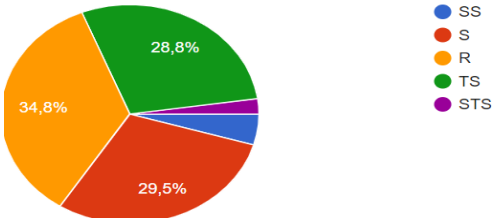

Figure. 4. Confidence in completing tasks

From the results of interviews with lecturers supporting physics lectures that in general lectures are still carried out conventionally, the teacher is present in the class explaining the material. The assignment of structured tasks as one of the innovations greatly helped the development of students' skills and talents. From the observations also obtained data that students are more enthusiastic about carrying out lectures when given assignments related to the concept of applied physics. Students can finish well and on time, and can present their assignments better. The information technology-based Project assignment program in learning Physics provides a clearer picture of how physics works in the community. The integration of Economi of Science, entrepreneurship, Nature of Science can better provide a clear picture of how Physics works in society [20]. Thus this program can be continued by revising several existing stages.

PRODUCT

At this stage an analysis of the data that has been obtained to see the achievements of the program. The data obtained is compared with the standards set in the first stage, as follows. 1) Students are able to understand and analyze physical phenomena in nature, especially about motion (mechanics) and simple cases (the principle of balance in daily life. With the products that students make, students indirectly conduct an analysis of physical symptoms in daily life, and construct the results of the analysis of the facts students find in the products they make. Then the results of the construction are conveyed in the presentation so that any misunderstanding is detected; 2) Students are able to carry out project assignments to see the application of applied physics concepts in everyday life. The information technology-based Project assignment program in Physics learning provides valuable experience for improving student competency. From searching for ideas, making products, assembling equipment, explaining the physical concepts of products that have been made, then making vlogs, and uploading them on YouTube. Togetherness, cohesiveness, and responsibility are also developed in this activity. 3) Students are able to arrange the relationship between physics courses with various businesses (entrepreneurship). Information technology-based Project assignment program in learning Physics provides a way of how the concept of physics becomes one of the efforts in developing and growing the economy in the field of science. Students have many insights into the opportunities for developing physical products. From this the students practice seeing opportunities and taking advantage of opportunities to gain profit (economic value). 4) Students have innovation and creativity, and entrepreneurial skills in carrying out physics learning project tasks based on technology development. In this project students are required to think, explore, and imagine from the search for ideas to uploading vlogs to YouTube. If this can be done repeatedly, then the innovation, creativity, and entrepreneurial skills of students will be well formed.

From the data obtained through a questionnaire that the high motivation of students who are not supported by their possession of reference books and students' self-distrust is more due to their impression that learning physics is only theoretical and mathematical. So that physics seems difficult and students are not confident to be able to complete these difficult physics tasks. The project assignment program based on information technology in physics learning provides a clearer picture of how physics works in society. The integration of Economy of Science, entrepreneurship, Nature of Science can provide a clearer picture of how Physics works in society [20]. Project-based learning familiarizes students directly involved in learning, and constructs their knowledge [21]. The knowledge that has been obtained will be combined with new knowledge and even discover new knowledge. In doing project assignments, students are given the freedom to actualize their ideas and abilities, so that their process skills develop. This process skill is what forms the entrepreneurial character of students, namely creative and innovative, taking advantage of opportunities, making changes, and providing added value for themselves and others. The results of project

assignments uploaded by DIYoutobe motivate students to make better work because they are judged not only by lecturers and friends but by the wider world. Project-based pursuits combined with online learning are effective in increasing students' motivation to learn [22]. High motivation in learning is the main capital in developing the entrepreneurial character of students.

IV. CONCLUSSION

Discrepancy Evaluation Models of Information Technology-based Project assignment programs in learning Physics can be concluded as follows. (1) Project assignment program based on information technology in learning Physics is considered quite good with a value of 3.70; (2) The program can be carried out by giving students assignments by making applied physics products that can be utilized in everyday life, then presented to see the truth of their physical concepts and product clarity, then students upload their videos to YouTube to see their market responses; (2) Information technology-based project assignment programs in learning Physics provide a clear picture of how physics works in the community. The integration of Economi of Science, entrepreneurship, Nature of Science can better provide a clear picture of how Physics works in society. Thus this program can be continued by revising several existing stages.

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