Management Study of the Impact of the Covid-19 Pandemic on Nutrition Vocational Education

Arintina Rahayuni*, Yuniarti Yuniarti, Galuh Sintadewi

Universitas Negeri Semarang, Indonesia
*Corresponding Author: damar345@gmail.com

Abstract. Vocational education emphasizes the skills aspect. During the pandemic, there was a change in conventional learning models to online, so it was necessary to study the impact on the quality of education (learning outcomes and competency achievement). The design in this study is an explanatory mixed method, differences in learning before and during the pandemic on 143 students, questionnaires were sent using google form. Data analysis using Mann Whitney test. The results showed that there were differences in conditions before and during the pandemic for components 1) lectures (interaction with students) 2) learners (optimism towards challenges) 3) student environment (residence and network access, academic/family support), 4) infrastructure, IT and financing (parental income conditions, monthly expenses and ease of internet access), 5) quality of educational institutions (budget adequacy, popularity of institutions, effectiveness of learning process, 6) learning process (learning access facilities and learning design explanations), 7) learning outcomes (the ability of lecturers to activate students and visualize teaching, continuity of material and motivation), 8) competency achievement (adequacy of knowledge, skills and work experience). Changes in learning methods as a result of the pandemic affect the learning process, so it needs to be followed up so that the quality of education does not decrease.

Keywords: covid-19 pandemic, nutrition vocational education.

How to Cite: Rahayuni, A., Yuniarti, Y., Sintadewi, G. (2021). Management Study of the Impact of the Covid-19 Pandemic on Nutrition Vocational Education. *ISET: International Conference on Science, Education and Technology , 7*(1), 704-718.

INTRODUCTION

Vocational education is part of the Indonesian National Education System which has a strategic role in creating a skilled workforce. Vocational education specifically has the aim of increasing knowledge, skills, intelligence, personality and noble character, as well as students' skills to live independently, work effectively and efficiently, and have the ability to develop their expertise and skills, mastering these areas of expertise on the basis of science and technology, has a high work ethic, is able to communicate according to the demands of the world of work, and is able to improve his abilities. Vocational education has a strategic role in preparing competent and professional Human Resources according to their field of expertise, able to carry out independent entrepreneurship and adapt to the demands of the latest technology according to the demands of the profession and competence (AIPGI and PERSAGI, 2014).

Markowitsch, Jörg (2017) expressed his opinion that vocational education is the result of combining three perspectives, namely 1) epistemological and pedagogical which focuses on the ability to support learning and competency development, 2) systems and institutions focus on providing and organizing work 3) socio-economic and labor market focuses on attracting attention to the functions of the changing nature and role of vocational education and training (VET) in society and the job market.

The specific characteristics of vocational education are the readiness of students to enter the world of work, focusing on mastering knowledge, skills, attitudes and values according to what is needed in the world of work, being responsive and anticipatory to advances in science and technology, focusing on learning by doing and hands-on experience. The learning process has a large practicum weight and requires large investment and operational costs as well. Vocational education is designed to be able to equip students with specific work skills & competencies according to their field of expertise. The preparation of curriculum & competency standards is adjusted to the skills needed and is a reflection of the competencies possessed by graduates (Wardiman, 1998).

The development of curriculum and learning systems is carried out holistically and sustainably in order to realize vocational education according to the demands of society and the world of work. Implementation of the Vocational Higher Education Curriculum in the higher education system and the implementation of regulation of the Minister of Research and Technology of Higher Education Number 44 of 2015 concerning National Standards for Higher Education, developed a learning model that is interactive,

holistic, integrative, scientific, contextual, thematic, effective, collaborative, and centered on Student Centered Learning, which requires students to actively develop, manage knowledge and skills, be oriented to student character development (life-long learning), use many media, lecturers as facilitators, evaluation is carried out together with students, learning and assessment carried out in an integrated and sustainable manner, scientific development is carried out interdisciplinary, the learning climate is collaborative, supportive and cooperative, student learning in various ways and activities, oriented to the achievement of competency skills and problem based learning.

Nutrition education in Indonesia can be categorized into three types, namely vocational education, academic education, and professional education. Vocational education that runs until 2011 is Diploma III and Applied Bachelors, 80% of which are in the form of Health Polytechnics under the auspices of the Ministry of Health. The majority of graduates work in the health sector with the main task of providing basic health services, providing nutritional services such as in Community Health Centers and Hospitals. Nutrition Vocational Education at Semarang Health Polytechnic is higher education that prepares students to have jobs with certain applied skills according to education level, at level 5 (Diploma III Nutrition), level 6 (Bachelor of Applied Nutrition) and level 7 (Nutrition Professional Education).

The Covid-19 pandemic has had a broad impact on the world of education, where learning process activities must be carried out online. encountered many obstacles or problems, mainly due to the unpreparedness of educational institutions in dealing with changes in the teaching and learning process. Long before the pandemic, higher education was actually encouraged to use online learning methods or blended learning, with this pandemic, higher education institutions in Indonesia inevitably have to switch to using online learning methods, all higher education activities are transformed using online.

In addition to learning in the classroom, in the laboratory and in the field, as well as other Higher Education Tridharma Higher Education activities (research and community service), almost all online seminars (webinars) are held virtually. During the pandemic, the social health and economic crisis will continue for a long time, but the process of teaching, education and academic activities must continue and can be maximized using online methods, including discussions between students and scientists using webinars, student exchanges and competitions among students. Universities during the Industrial Revolution Era 4.0, Society 5.0, and the Covid-19 pandemic faced the challenge of running an independent campus and self-study. 21st century skills for students require universities, especially vocational education, to place more emphasis on the skills of their graduates, to be able to prepare various kinds of student skills that are able to compete in the global era.

E-learning has many advantages because it can bring a new atmosphere and maximize learning outcomes. Other benefits are shortening study time and saving study costs, facilitating student interaction with learning materials, students can share information and access learning materials at any time and repeat them, so that learning materials are more mastered. The development of student knowledge does not only occur in the classroom, but with other groups or individuals in a network that activates . The quality of learning is always the same every time it is accessed and does not depend on the mood of the teacher. Learning will be more effective because it is delivered in the form of cases and simulations using animation technology. The distribution process is fast and able to reach all corners of the central server, increasing the interaction between students and lecturers, the available learning resources are not limited. The use of e-learning has a positive side because it can increase the absorption of the material being taught, the active participation of students and the ability to learn independently, the quality of the material is better, the ability to display information with information technology improves, and expands the reach of learning process without space and time limits. Materials are created and taken from valid sources and produced by experts.

Constraints from the online learning model are the limitations of competent human resources in the instructional technology (IT) field, infrastructure such as laptops or cellphones owned by parents of students, difficulties in accessing the internet network, electricity conditions that often turn off or are unstable, and expensive and limited internet quotas that can be provided. by parents. The obstacles faced by lecturers, parents and students during distance learning in general are 1) educators experience technical barriers and tend to focus on completing

the curriculum, 2) communication difficulties between educators and parents, 3) students have difficulty concentrating when studying from home, 4) increased feeling of stress and boredom, 4) difficulty in accessing good learning resources due to inappropriate access methods.

According to Pangondian, R.A. (2019) The success of online learning in the Industrial Revolution 4.0 is influenced by many factors. These factors are 1) lectures 2) leaners 3) student environment, 4) infrastructure, IT and financing, 5) quality of educational institutions 6) learning process, 7) learning outcomes, 8) competency achievement. The following in Figure 1 are the factors that influence the success of online learning.

An in-depth study of the positive and negative impacts of changing learning models during the Covid 19 Pandemic from conventional learning to online learning is needed in an educational institution, especially in Vocational Education. The demand for changes in conditions that are urgent, so fast and become imperative is the main reason why this study is needed. Changes in the learning model have actually been carried out in the Diploma III Nutrition Program of Semarang Health Polytechnic, but are still in the early stages or have not been maximally implemented, so this management study is expected to provide important information for institutional leaders, all lecturers, education staff and all stakeholders to maintain it even if possible. improve the quality of education, make careful planning in the future, so that the demands for competence and professionalism of graduates can be achieved and the needs of stakeholders can still be met.

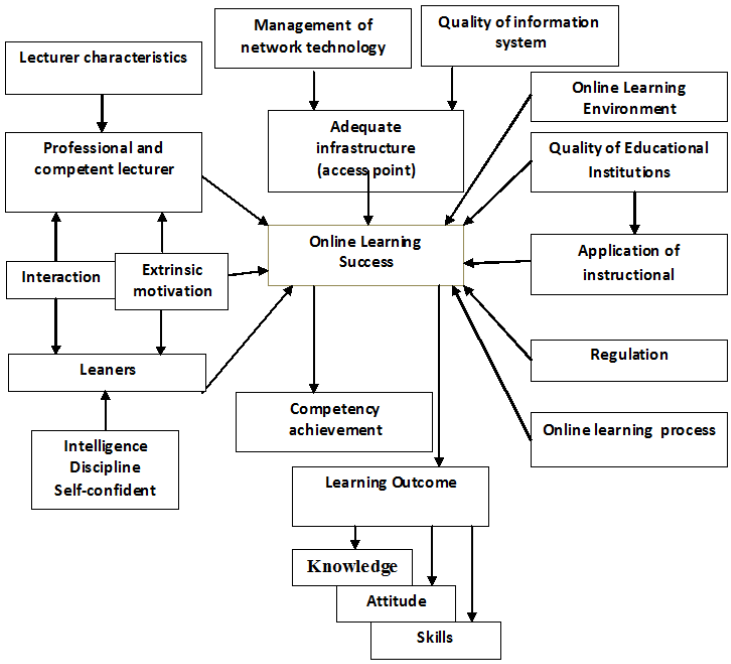
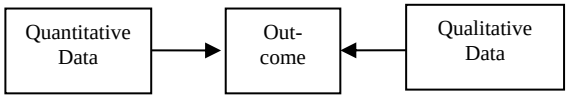


Figure 1. Factors that influence the success of online learning (Pangondian, R.A.,2019)

METHOD

Research design

The design used in this research is explanatory mixed method research, quantitative data is taken together with qualitative data collection to be further elaborated, elaborated to explain the results/findings.



The independent variable in quantitative research is the difference before the pandemic (conventional learning) and during the pandemic (online), while the dependent variable is the factor influencing the success of online learning including 1) lectures 2) learners 3) student environment, 4) infrastructure, IT and financing, 5) quality of educational institutions and 6) learning process. Due to distance limitations due to pandemic conditions, data was obtained by online survey using Google Form.

Population and Sample

The population in this study were all vocational students of the Diploma III Nutrition

Program totaling 234 students (first year student 91, sophomore student 96 and third year student 47). The sample of this study consisted of all sophomore student and third year student who had been exposed to conventional (before the pandemic) and online learning (during the pandemic) a total of 143 students. First year student, who were just exposed to online learning methods were not used as samples.

Research Place

The research was conducted at the Diploma III Nutrion Program of Health Polytechnic Semarang, Wolter Monginsidi street 115 Pedurungan Semarang.

The data collected includes:

Questionnaire to obtain data on factors that influence the success of online learning before the pandemic (conventional learning model) and during the pandemic (online learning model) using closed Likert scale questions with 5 assessment ranges and open questions include: 1) lectures 2) learners 3) student environment, 4) infrastructure, IT and financing, 5) quality of educational institutions and 6) learning process.

Data analysis

The stages of data processing include: editing (checking the completeness of data from instruments and forms), coding (changing the code), processing (processing data to be analyzed and cleaning (checking for errors after data is entered). Qualitative analysis is carried out by describing and concluding the factors which affect the success of online learning from the results of research on open-ended questions before and during the pandemic and their presentation in the form of percentage. Quantitative analysis was carried out to analyze data by comparing conditions before and during the pandemic using the Mann Whitney test at 95% confidence level.

RESULT AND DISCUSSION

The results of the study on lecturer factors (Table 1) include seven components showing that there are differences between the interaction components of lecturers and students before and during the pandemic ($p = 0.000$), most of the students stated that 2-way interaction was still going well, but learning interactions during the pandemic were less interesting. compared to before the pandemic. Students think that lecturers need 1) improvement in the use of IT, 2) increasing global insight, 3) updating science and technology, 4) improving communication and exchanging opinions, 5) providing explanations at the beginning of the lecture more efficiently and detail, 6) able to inspire and innovate to students when teaching, 7) learning should be carried out effectively and efficiently, according to a schedule and sufficient time allocation, 8) media and online learning process atmosphere are made interesting, 9) there is a match between deadlines for collecting assignments and task load, assignments are not too many and coordinated, 10) lecturers act professionally and are more patient and 11) lecturers understand the existence of generational transfer.

The results of the learning factor (Table 2) include six components, the component of optimism towards challenges shows differences before and during the pandemic ($p = 0.001$). The causes of the emergence of doubt and not being optimistic are: 1) fear of being wrong, cultural & cultural influences, pandemic situations, closed individual traits, 2) inferiority, uncomfortable mood & doubtful and unfocused thinking patterns, 3) not mastering science, 4) lazy and tired of dealing with complicated, complex and successive problems during the pandemic, 6) not confident, limited facilities, and easy to panic in pandemic conditions, 7) the spirit of competition does not exist because there are no discussion partners, think more simply , there is no support, 8) innovation and creativity do not exist because they are bored, afraid of risk, unable / have expertise, a lot of workload, cannot divide time and tend to want to relax.

Research on the student environment on six components (Table 3), the results are 1) housing component, 2) network access conditions and 3) social/academic/family/community support, showing differences before and during the pandemic with the same value. ($p=0.000$). Students stated that the difference was caused by busyness/other work responsibilities at home and outside the home, 2) it was difficult to divide time, 3) lectures and practice schedules were tight until late at night and assignments piled up, 4) bored/tired/bored/drowsy sitting all day dealing with laptops, 5) the atmosphere at home is crowded so that you don't focus on studying, 6) power outages, networks and cellphones that don't support, limited quota, 7) playing cellphones too often, 8) difficulty accessing reference books, and 9) difficulties to meet more people as a learning resource.

The results of the research on the infrastructure, IT, and financing (Table 4), the

differences before and during the pandemic occurred in components 1) the condition of parents' income, 2) the amount of monthly living costs, 3) the amount of monthly quota fees, 4) the amount of monthly transportation costs , 5) the amount of refreshing costs and personal needs and 6) ease of access/strength/network stability showed different (p=0.000). Students expressed hope that 1) additional quotas and quota assistance on time, 2) tuition fee reduction or installments, 3) the burden of replacement costs for home practicums can be increased according to expenses and 4) additional lecturer assistants for the smooth running of the practicum. Students also observe and provide input on the condition of campus facilities, stating that the campus is inadequate, too narrow (70%), the front view of the campus is not suitable (56.4%), lack of greenery (41.8%), not clean (20.9%)) and many insects, mosquitoes and mice (12,7%). 58.9% of students stated that the cost of education at health polytechnic was still too high. As for the sanitation hygiene facilities, students stated that they were inadequate for the male toilets 17.3%, female toilets 68%, hand washing facilities 16.4% and class cleanliness 15.5%.

The results of the study on the quality of educational institutions (Table 5), the differences before and during the pandemic occurred in the components of the budget adequacy of the learning process (p = 0.037), the popularity of the institution (p = 0.020) and the effectiveness of the learning process (freedom of learning and enjoyment (p = 0.000) 87.6% of students stated that IT equipment provides learning assistance and other academic activities and 27.5% of students stated that IT equipment management has not been effective and professional. A number of 12.3% of student respondents stated standardized and quality infrastructure. Students expect an increase in the standards of teaching and educational staff, 28.8% expect theoretical lecturers to be academically qualified S3, for practical teachers 41.1% expect a master's degree, while for education staff 84.9% expect a minimum bachelor's degree.

While the results of research on the online learning process (Table 6) show differences in 1) access to learning facilities during lectures (p = 0.000) and 2) the suitability of the presence of lecturers and students (p = 0.011). According to students, the differences in learning process were caused by 1) during the pandemic students felt less motivated, less interested and not able to act professionally compared to before the pandemic, 2) attendance before and during the pandemic were both deemed inappropriate, because before the pandemic manual signatures could be deposited, while during the pandemic with zoom lectures, some forgot to be absent or only absent but were not active in lectures, 3) students hoped the class schedule was more regular, 4) the task load was not overloaded and the task collection deadline was adjusted to the weight of the task, 5) better coordination between lecturers , 6) timely provision of quotas, 6) practicum courses during the pandemic are explained earlier, gradually so that they do not pile up at the end.

Students according to Semarang Health Polytechnic quality targets are expected to have a Grade Point Average (GPA) at the end of the semester 3.25 to be considered competent. Achievement of learning outcomes shows that there is a decrease in GPA 3.25. The percentage of achievement of learning outcomes in the form of a semester achievement index before the 2019/2020 odd semester pandemic in semesters III and V compared to the 2019/2020 even semester pandemic in semesters IV and VI as shown in Figure 2 below. The results of observations on the five components of learning achievement, there are differences before and during the pandemic for components: 1) lecturers are able to bring students to actively participate & have high interest (p=0.000), 2) learning process material is organized & comprehensive (p=0.001), 3) lecturers motivate continuously (p=0.029), 4) lecturers realize teaching with real conditions (p=0.000), 5) students' interest in learning (p=0.003). Students hope that during learning the lecturer can create active participation, be able to give more understanding to students, teach with more interesting media, and often motivate when teaching, during teaching the lecturer gives more real examples, students feel difficult, unable, even feel wrong in learning nutrition and entered the Department of Nutrition.

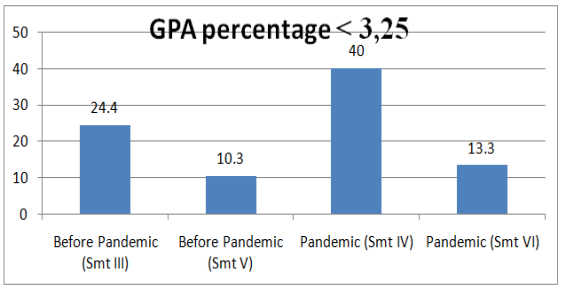


Figure 2. Comparison of GPA before and during the pandemic (%)

Table 1. Results of the Lecturer Factor Questionnaire (%)

Component	BP	P	BP	P	BP	P	BP	P	BP	P	p value
IT-based teaching skills	Not capable		Little able		Student help		Just some e learning		Very capable		0.326
	1	0	3	0	14	16	17	68	11	16	
global insight	Not global		A little global		Local insight		global insight		global insight, forward vision		0.428
	1	1	1	1	5	3	51	48	42	47	
Delivery of IT-based materials and references	Without IT		A little material		Local material		Global material		New global material		0.720
	0	1	8	4	20	13	45	46	27	36	
Interaction with students	One way interaction		Little interaction		Interaction if students are active		Two way interaction		2 way & interesting interaction		**0.000***
	0	1	3	7	14	23	43	51	40	18	
Motivate/inspire students	No motivation		A little motivation		Normal teaching		Able to motivate		Motivating and inspiring		0.290
	0	0	5	8	13	13	45	49	37	30	
Professionalism	Unprofessional		A bit professional		Normal professional		Look professional		Very professional		0.541
	0	0	0	0	10	7	62	72	28	21	
Character	Out of character		Lack of character		Character is a bit strong		Strong character		Very strong character		0.081
	0	0	0	0	17	7	66	72	17	21	

BP = before pandemic P = during pandemic, * significant

Table 2. Results of the Leaner Factor Questionnaire (%)

Component	BP	P	BP	P	BP	P	BP	P	BP	P	p value
Open minded	Be closed		sometimes be open		Depend on the situation		Open to updates		Always open		0.028
	0	0	2.5	7.7	40.2	47	23,1	21,4	34,2	23,9	
Optimis terhadap tantangan	Doubt often		sometimes doubt		Do not hesitate if the problem is complicated		Hesitating on complex challenges		Always optimistic		**0.001***
	1.7	4.3	2.5	12.8	28.2	28.2	38.5	43.6	29.1	11.1	
Careful problem solving	Just a macro problem		A macro and micro problem		Complete macro and micro		Macro and micro carefully		Macro and micro carefully and thoroughly		0.290
	0	5.1	11.9	12.8	32.5	41.9	21.4	13.7	34.2	26.5	
Confidence to accept responsibility	Less confident		confident, sufficient knowledge		confident, responsible		confident, big responsibility		confident, responsible and complex		0.580
	7.7	13.7	38.5	41.0	7.7	6.8	22.2	24.8	23.9	13.7	
Sharpen soft skills and hard skills	Following college friends		Sharpen hard skills		Sharpen softskill		Sharpen hard skills and softskill		Always hone hard skills and softskill		0.220
	3.5	5.1	12.8	17.9	8.5	38.5	35.9	38.5	39.3	30.8	
Competitive spirit, innovative/creative	Ordinary		Want to innovate		Sometimes innovate and compete		Always innovate & compete		competitive, innovative,creative		0.835
	12.8	13.7	21.4	16.2	27.4	35.9	19.7	18.8	18.8	15.4	

BP = before pandemic P = during pandemic, * significant

Table 3. Result of Environment Learning Factor Questionnaire(%)

Component	BP	P	BP	P	BP	P	BP	P	BP	P	p value
Residence	cost		Parent		Kinsfolk		Friend		Other		**0.000***
	73.7	3.5	21.1	96.5	7.0	1.7	0	0	0.8	0.8	
Network access conditions	Inadequate		Inadequate & unstable		Inadequate & smooth access		Adequate & unstable access		Adequate & smooth access		**0.000***
	0	0	2.6	4.4	4.4	10.5	17.5	43.9	78.1	41.2	
Distractions during online learning	Network		Crowd		Technology illiterate		2 problems above		3 problems above		0.831
	28.9	47.4	46.5	14.9	2.61	1.7	19.3	23.7	1.7	12.3	
Sufficient study time	No time		Time is short, there are other activities		Time must be spent		Enough time		Too much time		0.328
	0	4.4	17.5	11.4	22.8	20.2	58.8	57.9	0.9	6.1	
Social/academic/family environment support (community)	Unsupportive & difficult to communicate		Not supportive & difficult to access learning resources		Not supportive		Support		Support & easy access to learning resources		**0.000***
	0.9	0.9	0	1.7	2.6	20.2	55.3	54.4	41.2	22.8	
Study room	No special room		Space becomes one with room		Using the room with family/friends		There is a special room		There is a special room with adequate facilities		0.070
	19.3	15.8	57.9	48.2	8.8	16.7	6.1	7.9	7.9	11.4	

BP = before pandemic P = during pandemic, * significant

Table 4. Results of the Infrastructure, Financing and Network Factor Questionnaire(5)

Component	BP	P	BP	P	BP	P	BP	P	BP	P	p value
Parent's income condition	Just enough for living expenses		Biaya hidup & pendidikan anak		There is a little saving		There are advantages for refreshing		Enough for primary & secondary needs		**0.000***
	2.7	12.7	38.2	42.7	18.2	18.2	6.4	1.8	34.5	21.8	
Monthly living expenses	Less than 1 million		1-1.5 million		1.5-2 million		2-2.5 million		More than 2.5 million		**0.000***
	22.7	71.8	52.7	11.8	13.6	10.0	9.1	4.5	1.8	1.8	
The amount of the monthly quota fee	Less than 50 thousand		50-100 thousand		100-200 thousand		200-250 thousand		More than 250 thousand		**0.000***
	25.5	9.1	63.6	28.2	10.0	40.9	0.9	17.3	0	4.5	
Amount of monthly transportation fee	Less than 50 thousand		50-100 thousand		100-200 thousand		200-250 thousand		More than 250 thousand		**0.000***
	24.5	71.8	45.5	21.8	20.0	5.5	5.5	0.9	6.4	0	
Refreshing fee and personal needs	Less than 50 thousand		50-100 thousand		100-200 thousand		200-250 thousand		More than 250 thousand		**0.000***
	19.1	36.4	46.4	46.4	23.6	13.6	2.7	2.7	8.2	0.9	
Ease of access/strength/network stability	Difficult connection		Unstable		Sometimes it disconnects		Stable		Fluent		**0.000***
	11.8	45.5	44.5	24.5	22.7	17.3	15.5	8.2	5.5	4.5	
Adequacy of hardware (computer)	There is not any		There are limited quantities		There is a bad condition		There's enough		Sufficiently good condition		0.073
	0	1.3	43.8	28.7	15.0	11.2	32.54	45.0	8.8	12.5	
Adequacy of software (software)	There is not any		There are limited quantities		There is a bad condition		There's enough		Sufficiently good condition		0.659
	0	0	15.0	12.5	7.5	6.3	66.3	70.0	11.3	11.3	

BP = before pandemic P = during pandemic, * significant

The results of the study of competency achievement in the three components: 1) adequacy of knowledge provision by lecturers, 2) adequacy of skills provision by lecturers and 3) The learning process provides adequate experience as a work provision, showing that all there are differences before and during the pandemic (p = 0.000). The results of the data

recapitulation showed that students who had great motivation during the pandemic decreased from 54.8% to 31.0%, students who had a great interest in learning nutrition dropped from 58.3% to 26.2%, while those who stated they were able to be professional fell from 59.5% to 42.9%.

Discussion

Lecturer

Learning is a process of interaction between educators and students and learning resources that take place in a learning environment (Law Number 20 of 2003). Trianto explained in more detail in Pane & Dasopang (2017) that learning is an activity with complex aspects as a product of continuous interaction from life experience and its development, the meaning of complex is essentially a conscious effort from educators to teach students by giving direction. Interaction can also occur between students and other learning resources so that educational goals can be achieved. Learning is a system that has the goal of providing knowledge to students. The results of the observations showed that there were differences in the interaction of lecturers and students during the learning process before and during the pandemic, the percentage of students who stated that they had two-way and interesting interactions dropped from 40% before the pandemic to 18% during the pandemic. The system runs and there is interaction between educators and students through the process of delivering knowledge information. The process is in the form of providing planned guidance, stimulating and conditioning students to be able to learn well, marked by pedagogical educative interactions, educators prepare innovative learning that is able to stimulate student enthusiasm in carrying out learning activities.

Based on the results of Nawiroh Vera's research (2020) shows that the communication strategy of lecturers and students during online lectures is very important, especially to reduce boredom in attending lectures. With strategic steps: 1) Lecturers should try to optimize the online lecture process creatively, varied, and innovatively, so as to foster student learning enthusiasm.

Table 5. Results of the Quality Factors of Educational Institutions Questionnaire (%)

Component	BP	P	BP	P	BP	P	BP	P	BP	P	
Adequacy of PBM budget	Very less		Inadequate		Adequate		Very adequate		More than enough		**0.037***
	0	1.2	20.9	38.4	57.0	41.9	20.9	15.1	1.2	3.5	
Adequacy/availability of institutional managers	Unskilled & Very inexperienced		Lack of skill & experience		Sufficiently skilled & experienced		Experienced & skilled		Very experienced & skilled		0.463
	0	0	3.5	23.0	40.7	38.4	53.5	53.5	2.3	5.8	
Job fair/graduate promotion	There is not any		Very less		Adequate		Good promotion		Good & very wide promotion		0.362
	5.8	7.0	24.4	26.7	33.7	36.0	29.1	27.9	7.0	2.3	
Institution popularity	Unknown		Known to a limited circle/profession		Known in Central Java region		Known at the national level on a limited basis		Widely recognized at the national level		**0.020***
	7.0	9.8	26.7	31.4	35.0	18.6	27.9	29.1	2.3	19.8	
Tuition fees are equivalent to other vocational education in Indonesia	Too expensive		Too cheap		Needs to be lowered a bit		Corresponding		In accordance with the fulfillment of facilities		1.000
	3.5	3.5	0	0	23.3	23.3	37.2	32.2	36.0	36.0	
PBM effectiveness (free learning & fun)	Not fun		Less fun		Pleasant		Very pleasant		Fun & there is freedom to learn		**0.000***
	0	4.6	3.5	9.3	30.2	61.5	45.3	9.3	20.9	15.1	
Solutions to facility problems by institutions	There is not any		Very limited		Limited		Not optimal		Very good		0.097
	0	1.1	1.1	8.1	33.7	33.7	50.0	47.7	15.1	9.3	

BP = before pandemic P = during pandemic, * significant

Table 6. Results of the Learning Process Factors Questionnaire (%)

Component	BP	P	BP	P	BP	P	BP	P	BP	P	
Student health condition	Chronic		A bit heavy		Light		Sometimes		Never		0.673
	0	0	0	1.2	1.2	4.8	53.4	41.7	46.4	52.4	
Strata of work in the neighborhood	Fsrmer		Government employees		Labour		Self employed		Etc.		0.579
	2.4	7.1	41.7	39.3	8.3	6.0	34.5	34.5	10.7	10.7	
Educational strata in the neighborhood	No School		Primary school		Secondary school		High school		College		0.388
	0	0	1.2	2.4	4.8	3.6	33.3	36.9	63.1	57.1	
Age group in the neighborhood	Children		Teenagers/Peers		Working age		Elderly		Heterogenous		0.112
	6.0	13.1	33.3	9.5	34.5	41.7	2.3	6.0	23.8	29.8	
Means of access to learning during college	Too much		borrow		Cyber cafe		The network cellphone / laptop is not good		Good network cellphone/laptop		**0.000***
	0	0	0	0	0	0	21.4	53.6	79.6	46.4	
Appropriate attendance of lecturers and students	Not fun		Less fun		Pleasant		Very pleasant		Fun & there is freedom to learn		**0.011***
	0	0	6.0	19.5	0	6.0	15.5	23.8	78.6	60.7	
Evaluation of material achievement during PBM	Never		Sometime		If there is time		Close the exam		Every time after study		0.793
	1.2	1.2	26.2	29.8	38.1	33.3	11.9	11.9	22.6	23.8	

BP = before pandemic P = during pandemic, * significant

Table 7. Result of the Learning Outcomes Questionnaire(%)

Component	BP	P	BP	P	BP	P	BP	P	BP	P	p value
Lecturers are able to bring students to participate actively & have high interest	Not interested		Just attend college		Take lectures and take notes		Taking lectures/notes/resume		Actively ask		**0.000***
	0	0	0	1.2	1.2	4.8	53.4	41.7	46.4	52.4	
The sequence of learning process material is organized & comprehensive	Inappropriate material		Submission is not clear		Submission not in order		Clear and massage		Sequentially. simple and easy to understand		**0.001***
	2.4	7.1	41.7	39.3	8.3	6.0	34.5	34.5	10.7	10.7	
Lecturer motivates continuously	Never		sometimes		Just to motivate		Really motivating		Continuously motivating		**0.029***
	0	0	1.2	2.4	4.8	3.6	33.3	34.5	53.1	57.1	
Lecturers realize teaching with real conditions	Never (theoretical)		Sometimes & not clea		Quite clear		Give real examples		Real examples & interactions with the environment		**0.000***
	6.0	13.1	33.3	9.5	34.5	41.7	2.3	6.0	23.8	29.8	
Student interest in learning	Forced. unable		Interested. underprivileged		Lack of interest		Interest		Very interested & very capable		**0.003***
	0	0	0	0	0	0	21.4	53.6	79.6	46.4	

BP = before pandemic P = during pandemic, * significant

Table 8. Result of the Competency Achievement Questionnaire (%)

Component	BP	P	BP	P	BP	P	BP	P	BP	P	p value
Sufficient supply of knowledge by lecturers	Have to add myself		Inadequate		Adequate		Very adequate		More than national standard		**0.000***
	0.9	19.6	6.25	15.2	47.3	47.3	44.6	44.6	0.9	0.9	
Adequacy of skills provision by lecturers	Have to add myself		Inadequate		Adequate		Very adequate		More than national standard		**0.000***
	19.6	19.6	0	15.2	15.2	47.3	47.3	17.0	0.9	0.9	
PBM provides adequate experience as a work provision	No experience		Less experience		Enough to give experience		Great experience		Really gives real experience		**0.000***
	0	9.8	2.7	33.9	24.1	39.3	51.8	16.1	21.4	10.9	

BP = before pandemic P = during pandemic, * significant

Material variations that do not only rely on modules, but are added with audio-visual materials are proven to reduce student boredom; 2) Implementing two-way communication, providing opportunities for students to respond, either in the form of questions, discussions, and comments on what was conveyed by the lecturer. Lecturers position themselves as motivators by prioritizing communication, being able to be good listeners, and being the first to give the initiative, so that students dare to express their opinions actively; 3) Students need attention from lecturers, small things such as replying to emails, replying to WhatsApp make students feel cared for, if they give assignments, they should be immediately given a grade or at least given a comment, so students feel stimulated because what they are doing is not in vain.

Learners

Online learning has started since March 2020. Students independently must actively follow information updates regarding the platform of courses that will be carried out online, giving assignments/quiz, and providing materials. The learning technique fully adapts to the policies of the lecturers of each subject. Platforms that can be used include google classroom, video conference, live chat, zoom, googlemeet, skype and whatsapp group. As for the Semarang Health Polytechnic students, they also take advantage of the applications that are already available, "Healthy" and "Simadu". Online learning is one of the innovations in the field of education to answer technological challenges and the availability of more varied learning resources. The main problem for students is that optimism about challenges shows that there are differences before and during the pandemic. The number of students who felt always optimistic before the pandemic dropped 29.1% to 11.1% during the pandemic.

Muhajir Effendy, Coordinating Minister for Human Development and Culture, emphasized the importance of youth to have a positive and optimistic attitude during a pandemic, not to give up easily, and to always be persistent in facing future challenges, students need to apply 5C, namely 1) Good Critical Thinking, 2) Creativity have creativity to advance, 3) Communication has the ability to communicate and master foreign languages, 4) Collaboration can work with friends and 5) Character, character, personality, honest and social character.

Learning environment

The success of learning is not only seen from a technical side but also depends on many factors. Nakayama M. (2007) revealed that e-learning indicates that not all students will be successful in online learning. This is due to differences in learning environment factors and the characteristics of each student. Online learning at each University applies different forms and techniques. The output is that many students feel that they do not understand the material, have more independent assignments, and have difficulty doing practicum as supporting courses. Practicums conducted online sometimes cannot be practiced at home due to limited tools and experimental samples. Lecturers are also more difficult to supervise students during online learning because it is limited to the media, so there are students who fall asleep when the lecturer delivers the material or students only attend but do not listen. In addition, another problem with online learning is that the internet signal is still limited in some areas, thus hampering the learning process.

Problems that arise from the learning environment for Semarang Health Polytechnic Nutrition students are 1) housing, changes before the pandemic in boarding conditions near the campus environment with a position in urban areas where most of the college friends (73.7%) become during the pandemic the home environment with conditions partly in the village some even live in difficult-to-access areas with various age and educational strata of society (96.5%). The condition of network access before the pandemic stated that it was adequate and smooth 78.1% to 41.2% as well as environmental support for easy and supportive learning from 41.2% before the pandemic to 22.8% during the pandemic. This has consequences for the effectiveness of online learning during the COVID-19 pandemic, it is said that it is relatively dependent on the supporting components in the online learning process, it is hoped that this learning will bring the best results despite the existing limitations. Students are expected to be independent and more active in learning not only relying on the material that has been given, but also from other sources. Lecturers and educational institutions should adapt the curriculum to the circumstances, so that online lectures can still be carried out, are not too burdensome and have large gaps. An attractive, active, and acceptable learning model is needed

for all student conditions. Online learning in the long term, with real conditions where there are restrictions on field activities or practicums, requires blended learning innovation.

Infrastructure, IT and Financing

Online learning is a program for organizing classroom learning in a network to reach a massive and broad target group, using multimedia technology, virtual classrooms, CD ROMs, video streaming, voice messages, email and telephone conferences, animated online texts, and online video streaming (Thorme in Kuntarto 2017). The advantages of online learning are that it saves learning process time, saves travel and education costs, covers a wider geographical area, trains students' independence in gaining knowledge. While the shortcomings of online learning are the lack of interaction which results in delays in the formation of values in learning process, tends to ignore academic or social aspects and encourages the growth of business aspects, learning process tends towards training rather than education, students who do not have high learning motivation tend to fail and not all places are available. internet, electricity or computer facilities.

Routine costs (recurrent costs) of the learning process operational activities of the Diploma III Nutrition Program are in accordance with Government Regulation 23/2005 concerning Public Service Agency Management, chapter 9 subsection 5, where the proposed fare fee pattern takes into account continuity and service development, people's purchasing power, the principles of justice and propriety as well as the flexibility of financial management. Adjustments are easier to make but the budget disparity between health polytechnics is quite high. Suggestions submitted by students are to provide tuition fee waivers, complete facilities (campus wifi, practical equipment, classroom air conditioners), provision of adequate quotas, adequacy of spending costs for student practice and activities. In the future, it is necessary to study the effectiveness and efficiency of learning process funds. A review of the budget shows a significant reduction in travel spending and field practice costs. In the 2020 budget (pandemic period), there are additional activities for the development of study programs for curriculum revision workshops, the budget is obtained from travel spending revisions. Efficiency has a positive impact on the development of the Diploma III Nutrition program, but on the other hand it is necessary to study the achievement of student competencies because practicum, street vendors and field practice activities are not carried out optimally. The proposed tariff pattern should be prepared based on this study, in order to obtain an appropriate unit cost by taking into account the size of the fare fee patterns for other health polytechnics. It is also necessary to consider the possibility of providing assistance to students with unfavorable financial conditions, it is recorded that there are 6.4% of students whose parents are no longer able to pay for college due to layoffs and uncertain income.

The results of research on individual personal costs are different in all components, 0.9% of students do not have an adequate cellphone or laptop as a means of online learning. Students' monthly living costs have decreased, due to the change from boarding conditions to living at home with their parents. This affects the ease of network access, before the pandemic, internet access was smoother and more stable 21% decreased to 12.7%. The problem that occurred before the pandemic was the weak campus internet network (Arintina, et al., 2020).

Quality of Educational Institutions

Educational institutions that are accountable, qualified, both in resource management, able to compete with other educational institutions and can lead their students to higher education levels or to the world of work with the provision of science and technology as well as technical skills that are needed by the business world and the world of work. industry, institutions like this are educational institutions that are in demand by the public and good and quality educational institutions.

Steps that must be taken by managers of educational institutions to create good and quality educational institutions are to always pay attention to and identify the wishes of the parties involved, namely, among others, namely 1) compliance of educational institutions with regulations imposed by the government, 2) fulfilling the desire of students and parents to get good service, quality graduates, virtuous, skilled and responsible, 3) a cool, comfortable and conducive learning environment for self-development, 4) welfare, health and safety guarantees for educators and education staff, 5) investor interest in the reputation of educational institutions, and 6) user institutions are satisfied with the labor produced and ready to use. The difference before and during the pandemic

occurred in three components of the quality factor of educational institutions, namely 1) the adequacy of the learning process budget which stated that it was adequate and adequate from 77.9% down to 57.0%, 2) the popularity of the Central Java regional level institutions decreased from 35.0 % to 18.6%, while at the national level it rose from 30.2% to 48.9%, 3) Learning process effectiveness, learning freedom and fun decreased slightly from 20.9% to 15.1%.

Learning process

Along with the emergence of the Covid-19 outbreak in the hemisphere, the education system began to look for an innovation for the process of teaching and learning activities. There is Circular Letter Number 4 of 2020 from the Minister of Education and Culture which recommends that all activities in educational institutions must pay attention to social distancing and all material submissions will be delivered at their respective homes. Educational institutions are required to provide the latest innovations to create an effective learning process, but not all educational institutions understand the latest innovations that must be used to conduct learning during the pandemic, due to constraints on facilities and infrastructure.

According to experts, the appropriate learning methods used during the pandemic are: 1) Project based learning, the implications of the Circular Letter of the Minister of Education and Culture Number 4 of 2020. This method is effectively applied to small study groups in working on projects, experiments, and innovations and is suitable for students in yellow or green zone with due observance of the applicable health protocols; 2) Online Method, which is effective in dealing with the unfavorable situation of the pandemic, students can take advantage of existing facilities around the house properly, all learning activities are carried out through an online system and are suitable for students in the red zone area, so that learning remains safe; 3) Offline Method, face-to-face learning outside the network by paying attention to zoning and strict health protocols, suitable for the new normal yellow or green zone. Students will be taught in shifts (shift model) to avoid crowds, the curriculum should be simplified, so as not to be complicated and suitable for online systems that lack facilities and infrastructure; 4) Home Visit Method, similar to home schooling learning, this method is very suitable for students who do not have an adequate set of technology, the materials and assignments given will still be delivered properly; 5) Integrated Curriculum, each class is given a relevant project, involving several courses and linking it with several learning methods. There is student collaboration in working on projects, lecturers form team teaching with other subjects, this method can be applied to all zones, applied online, so it is very safe, 6) Blended Learning, using online and face-to-face approaches through video conferences, students and teachers do distance learning but can still interact. This method is effective for improving cognitive abilities.

The six methods have been widely used by universities and are expected to bring education in Indonesia to run well and smoothly. The results of research on Nutrition Polkesmar students, showed differences before and during the pandemic in 1) access to learning facilities during college, the condition of the cellphone/laptop and network in good condition decreased from 79.6% to 46.4%, due to the heavy burden of the cellphone/laptop while online. and unstable network and 2) student attendance from 78.6% to 60.7%, due to boring learning and networking, so they are lazy to study online.

Learning Outcomes

Higher education as an institution has challenges to be able to produce quality graduates according to user needs, so that the academic community is expected to be able to actualize themselves professionally. (Caroline, 2008). The success of the implementation of the learning process can be seen from student learning achievement, it is expected that students can obtain the highest learning achievement. A good final grade of students indicates that their learning achievement is good, the process of transferring knowledge from teachers to students is successful. The final grade of the course is a feedback on the students' abilities, fatigue, shortcomings, and potential (Siagian, 2003).

Adjani and Adam's (2013) research on student learning achievement on learning experience, motivation, family environment, and teaching quality revealed that student learning experience and motivation had an influence on learning achievement, while family environment and teaching quality had no effect. Students who are interested in certain subjects tend to listen and understand the course material and have a positive impact on learning achievement. Students who have strong and high motivation will enlarge their efforts to achieve high learning

achievement.

Iskandarsyah and Imam Ghozali (2012) in their research concluded that the factors that influence student learning achievement include the teaching style of lecturers, assistance to students, lecture structure, and learning facilities. Students prefer the teaching style of lecturers who are attractive, do not pressurize and do not like lecturers who cannot make the class atmosphere comfortable, so that students' understanding and achievement in studying subjects will increase. Regular and systematic assistance makes students better understand the subject and improve their learning achievement, so that they have good grades. The use of a lecture structure that is in accordance with the course will be able to improve student learning achievement.

Muryono (2000) also revealed that there are two things that affect learning achievement, namely internal factors (physiological and psychological factors) and factors including external family environment (family socioeconomic status, education, parental attention), school environment (facilities and infrastructure, teacher competence, students, curriculum, quality of teaching and learning) as well as the community environment (social culture and participation in education), it can be concluded that internal factors influence student achievement more.

The results showed that there was a decrease in learning outcomes seen in the increase in learning achievement in the form of a Grade Point Average (GPA) of less than 3.25, the number increased in the third semester before the pandemic by 24.4% to 40.0% in the fourth semester during the pandemic and the fifth semester before the pandemic. 10.3% to 13.3% in semester VI during the pandemic due to a decrease in active participation and interest of students in learning, lack of comprehensiveness and orderliness of learning process material, no continuity of lecturers in motivating students and lecturers less able to realize teaching in real conditions.

Competency achievement

Other problems that are generally experienced by educational institutions in Indonesia include the achievement of the competency target of graduates who are still low, the learning system in several hospitals is not adequate, the constraints of facilities and infrastructure for practical land as a place of learning and the average passing rate of student competency tests that are still in school. below 85% so it is important to look for factors that affect the achievement of student competencies as part of the solution and problem solving. The results of the study show that the components of the adequacy of knowledge and skills by lecturers and providing adequate experience as work supplies, there was a decline during the pandemic, students who stated they were able to act professionally fell from 59.5% to 42.9%. Competency standards for graduates in academic and professional education are the minimum criteria for qualifying graduate abilities that include attitudes, knowledge, and skills expressed in the formulation of academic and professional education learning achievements. Covid-19 has a significant impact on the achievement of competency standards.

Restrictions on physical activity only allow distance learning and is more related to the cognitive aspect and is carried out online. Psychomotor and affective aspects are difficult to carry out so that practical activities, field assignments, activities in hospitals, and research are difficult. This activity cannot be replaced with an online distance learning model. The psychomotor aspect at the academic level is the most important aspect most affected by the pandemic disaster, because it requires physical presence and medical skills. At the professional level, clinical rotation, for example, becomes difficult or impossible. E-learning and e-exam activities at home generally only reach the cognitive aspect (Kemendikbud Center for Education and Culture, 2020).

The Ministry of Health of the Republic of Indonesia has 38 Health Polytechnic educational institutions that hold more practice learning about 60-70%. Referring to the policy of the Ministry of Education and Culture, during the pandemic, theoretical and practical learning is carried out online, using the blended learning method. Meanwhile, clinical and field practice learning, which was postponed at the end of the semester, turned out not to be implemented in the end, so that efforts to maintain the competence of graduates of health vocational students became a dilemma. Ignoring practice has implications for graduate competence. Using the simulation method, the results are different from human objects. In addition to hard skills, students are required to have soft skills, which are obtained when interacting directly with patients/clients and their families.

The wise choice taken at the Department of

Nutrition is to continue to carry out clinical practice in health care facilities, by implementing strict health protocols. The obstacle that arises is that health care facilities have a policy of limiting the number of clinical practice students. Another policy is to reduce the minimum target for achieving graduate competence, and the impact on the achievement of competence has not yet been described. Special policies for practical learning strategies are needed in health vocational higher education institutions, which are the authority of the Directorate General of Vocational Education, Ministry of Education and Culture. However, until now, there has been no circular letter specifically issued regarding practical learning in universities, as a follow-up to the 4 Ministerial Decree concerning Guidelines for the Implementation of Learning in the 2020/2021 Academic Year in the Pandemic Period. Especially for Poltekkes of the Ministry of Health, there has been a special policy regarding practice in health care facilities. Practical learning can be done by applying the health protocols determined by the practice vehicle, including the use of complete PPE. It turns out that this has the potential to cause new problems, because students have to spend quite a lot of money for expensive Ministry of Health standard PPE. The dilemma that occurs regarding practical learning at the Health Polytechnic of the Ministry of Health must be discussed together by the Ministry of Health, Ministry of Education and Culture, Health Professional Organizations, Association of Health Worker Educational Institutions, Independent Accreditation Institutions, Health Universities, and other stakeholders, so that the best solution can be taken. can provide convenience and security for students, without having to reduce the quality of graduates.

CONCLUSION

Many factors play a role in the achievement of learning outcomes and competence of nutritional vocational students, of the six factors, the most affected by Covid are infrastructure, facilities and financing factors, namely online infrastructure, access and tuition financing. The problem with the teaching staff is the problem of two-way interaction between lecturers and students that is not optimal, the problem of student factors is the decrease in student learning motivation, the problem of environmental factors is the change of domicile which has an impact on inadequate access to learning resources. The problem that arises in the teaching and learning process is that there is a decrease in the number of student attendance at online lectures for reasons of boredom and boredom. Compressively, these factors affect the achievement of learning outcomes and competence of nutritional vocational students.

Acknowledgdment

Thanks are expressed to the Director and Head of the Department of Nutrition, Poltekkes, Ministry of Health, Semarang, who have supported this research and to the Diploma III Nutrition Program students who have played an active role as respondents in this research.

REFERENCE

Arintina Rahayuni, Ida Zulaecha, Kardoyo, Rusdarti, Edy Cahyono, Supriyana (2020). The Effect of the covid-19 pandemic on education costs in vocational nutrition polytechnic. *European Journal of Molecular & Clinical Medicine Volume 07, Issue 01*. https://ejmcm.com/pdf_5974_d7bd665a7fc82b4ef129ca3d18fd087d. html

Bimacahya, N.M. (2020, September 30) *Optimalisasi pencapaian kompetensi mahasiswa profesi dokter di era pandemi*. Pusat Pendidikan dan Pelatihan Pegawai Kementerian Pendidikan dan Kebudayaan. https://www.google.com/search?q=pencapaian+kompetensi+mahasiswa&oq=pencapaian+kompetensi+mahasiswa+&aqs=chrome..69i57.12992j0j7&sourceid=chrome&ie=UTF-8

Djojonegoro, Wardiman (1998) . *Pengembangan Sumber Daya Manusia Melalui SMK*. Jakarta : PT. Jayakarta Agung Offset.

Dwi Rustandi (2020, Oktober 22). *Transformasi pendidikan tinggi dan akselerasi inovasi perguruan tinggi di masa pandemi*. Direktorat Jenderal Pendidikan Tinggi Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi https://dikti.kemdikbud.go.id/kabar-dikti/kabar/transformasi-pendidikan-tinggi-dan-akselerasi-inovasi-perguruan-tinggi-di-masa-pandemi/

Hutasoit, Lia (2020, Mei 6). *Delapan puluh sembilan persen mahasiswa tidak suka daring karena masalah internet : survei Kemendikbud pada 237.193 responden mahasiswa.* IDN TIMES. https://www.idntimes.com/news/indonesia/lia-hutasoit-1/89-persen-mahasiswa-tidak-suka-kuliah-daring-karena-masalah-internet/6

Keputusan Menteri Kesehatan No. 374/Menkes/SK/III/2007 tentang Standar Profesi Gizi. https://persi.or.id/wp-content/uploads/2020/11/kmk3742007.pdf

Kuntarto, Eko (2017). Keefektifan model pembelajaran daring dalam perkuliahan bahasa indonesia di perguruan tinggi. *Journal Indonesian Language Education and Literature Vol. 3, No. 1*. https://www.syekhnurjati. ac.id/jurnal/index. php/jeill/article/view/1820/1450

Markowitsch, Jörg (2017, Oktober). *Conceptions of vocational education and training: an analytical framework.* European Centre for of Vocational Development for The Development of Vocational Training. file:///C:/Users/HP/Downloads/5563_en. pdf

Martias, Adhi Dharma Suriyanto, A. Yudo Triartanto (2019). Membangun budaya belajar mahasiswa melalui pembangunan teknologi informasi. *JMP Online Vol. 3 No. 7 1010 – 1021.*

Mohamad Judha, Adi Sucipto, Tia Amestiasih, Siti Fadlila (2019). Analisa faktor pencapaian kompetensi mahasiswa ners unriyo di RSUD Dr Moewardi Surakarta *Jurnal Keperawatan* Vol. 8, No. 2, pp. 48–60. https:// ejournal.poltekkesjogja.ac.id/index.php/caring/article/view/522/351

Nakayama, M. dan Yamamoto H. (2007). The impact of learner characterics on learning performance in hybrid courses among japanese students. *Elektronic Journal ELearning*, Vol.5(3). https://files.eric.ed. gov/fulltext/EJ1098825.pdf

Nawiroh, vera (2020) . Strategi komunikasi dosen dan mahasiswa dalam meningkatkan kualitas pembelajaran daring selama pandemi covid-19. *Avant Garde Journal Vol. 08 No. 02, 165-177.*

Permenristek Dikti No.44 Tahun 2015 tentang Standar Nasional Pengidikan Tinggi. https://img.akademik.ugm.ac.id/unduh/2015 /PERMENRISTEKDIKTI_Nomor_44_ Tahun_2015_SNPT.pdf

Sukardi dan Muhammad Hudan Rahmat (2019). Pencapaian hasil belajar teori kejuruan ditinjau dari persepsi mahasiswa pada pembelajaran online. *Jurnal Dinamika Vokasional Teknik Mesin* Volume 4 Nomor 2 Hal. 111-116. https://journal.uny.ac.id/ index.php/dynamika/article/view/27394/125 55

Tim Penyusun Naskah Akademik Sistem Pendidikan Tenaga Gizi (2014, November 20). *Buku naskah akademik : sistem pendidikan tenaga gizi bagian I dan II. AIPGI dan PERSAGI.* http://aipgi.org/docaipgi/Naskah%20Akademik%20Sistem%20 Pendidik%20Tenaga%20Gizi.pdf

Undang-undang No.20 tahun 2003 tentang Sistem Pendidikan Nasional.

Universitas Muhammadiyah Yogyakarta (2020, September 28). *Mahasiswa baru harus punya sikap positif dan optimis di kondisi pandemi covid-19.* Mataf-UNY. https:// www.umy.ac.id/mahasiswa-baru-harus-punya-sikap-positif-dan-optimis-di-kondisi-pandemi-covid-19