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Need Analysis of Developing 21st Century Learning Skill in Technopreneurship in the Digital Age

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Abstract—This study aims to analyze the need for the development of 21st-century technology era entrepreneurship learning in tertiary institutions. This needs analysis explores in depth the importance of entrepreneurial learning, especially the role of entrepreneurial learning in improving 4C competencies (critical thinking, communication, collaboration, creativity) as competencies in the 21st century. This type of research is descriptive survey method. Data collection techniques are the distribution of questionnaires and interviews. The sample is students of the Faculty of Computer Science, lecturers of entrepreneurship courses. Data analysis techniques used in this study are quantitative and qualitative. Based on the results of the needs analysis conducted quantitatively and qualitatively, based on the analysis conducted it can be concluded that there is a gap between the needs and expectations of students and entrepreneurial lecturers, especially in terms of learning models (methods, approaches, materials, modules, and other teaching materials) used), and the existence of recommendations as a result of needs analysis related to the need for innovation to build student competence in the 21st-century is expected. Also, this study revealed that students of the faculty of computer science, lecturers of entrepreneurship courses, require the development of learning models that support the improvement of 21st-century competencies needed in face competition in the digital age.

Keywords— need analysis, 21-st century learning, technopreneurship, 4C

I. INTRODUCTION

The development of technology enables automation in almost all fields. The 21st-century technology approach that combines the physical and digital world will fundamentally change the pattern of life and human interaction [1]. Changes and technological innovations that develop in the world of work and industry, making the structure of the type of work in the world of work also changes. Various types of jobs require new competencies so that industrial production with new technology can be of economic value to the nation and state. The 21st-century industrial competition will depend on the ability of the industrial world to create innovations in its production goods, to compete in the free market, because every innovation in engineering requires a skilled workforce with intellectual and intelligence levels to be able to compete with other nations [2].

The paradigm shift occurred in the learning processes and situations in the technological and digital era that have the characteristics of learning including learning in a free, independent and collaborative space, learning with digital materials, learning to use information technology and electronic communication media resulting in the need for innovation in learning per under the times [3]. Innovations were made to balance the conditions and challenges of the 21st century including paradigms and challenges in the world of work that are full of unlimited business competition as a result of the development of the internet, doing business by collaborating and forming networks, doing business by selling ideas and doing business by utilizing digital media.

Changes to the 21st-century education paradigm along with the challenges created in the digital age, world entrepreneurship experts state that entrepreneurship is an engine of world economic power, therefore integration and creation of innovations in industrial units is needed as a result of the development of machines in technology [4]. World economic experts also view that entrepreneurship will be a source of economic power in countries around the world, for this reason, strategic efforts are needed in creating digital entrepreneurs [5]. The formation of entrepreneurial character in the education process must be a special

concern to achieve the excellence of human resources because Entrepreneurship will become the economic power of a country to grow in independence.

The 21st century, known as the century of openness, has fundamentally shifted the order of human life. This has resulted in demands for the quality of human resources who have competitive competencies that are in harmony with the spirit of entrepreneurship as a superior character that is highlighted to be able to become a strong, resilient and characterized person so that they can compete in the era of globalization. Based on the opinions of education experts, it has been stated that the failure of the education system was felt in this era in preparing students to face demands in the 21st century [6]. Educational experts have recommended that to produce a global economic workforce in the 21st century requires different learning models and goes beyond 20th-century repetition skills, basic applied knowledge and not just literacy [7]–[9] Therefore the learning process carried out should refer to the preparation of learning outcomes that have the competencies needed to compete in the 21st century.

The role of strategy is owned by universities to provide quality human resources who have the responsibility in solving problems and challenges in the 21st century's competence[10]. Higher education institutions through a quality learning process are obliged to organize education professionally and must make innovations through development that aims to create learning output that is ready in the face of 21st-century challenges [11], [12]. Innovation in the learning process to shape people who have the mindset of the 21st century is the task of education and the parties involved in the education process (Iskandar et al., 2019). This breakthrough and innovation are a must so that the quality of higher education graduates is not oppressed by the changes and developments of the times.

Every individual has the skills or skills both hard skills and soft skills that are qualified to be able to enter the world of work and be ready to compete with other countries' resources as demands for 21st-century technology development. According to Bernie Trilling and Charles Fadel [13]. The core of the skills that must be possessed in the 21st century is learning and innovation skills, information skills, media, and technology, as well as life and career skills, in line with that opinion National Education Association [14]. states that 18 kinds of 21st-century skills that need to be equipped for each individual, where one of them is Learning and Innovation Skills which consists of 4 aspects, namely critical thinking, communication, collaboration, and creativity as seen in figure 1.

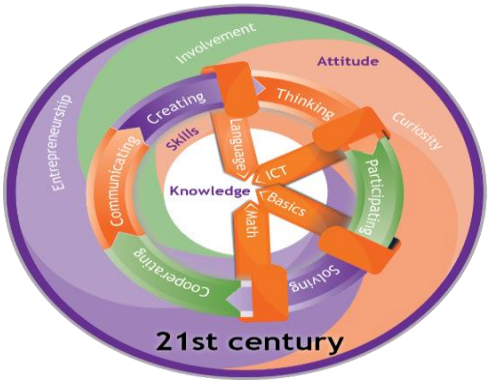

Fig.1. The Framework of 21st-Century skills Source: Trilling & Fadel (2009:119)

The concept of learning in the 21st century, although paying attention to the learning needs of students who are active, cooperative, participatory, reactive and fun with innovative learning approaches and able to foster student motivation in entrepreneurship [15]. Based on this formulation, it is deemed necessary for all tertiary courses to be developed oriented to the abilities of entrepreneurship [16]. Curriculum reorientation, hybrid / blended learning, and life-long learning are needed to improve the quality of graduates, this means that learning in higher education must be able to adapt in using and utilizing technology properly so that there are abilities that must be possessed by graduates who become literacy in facing the challenges of the industrial revolution era 4.0

The Alignment of real-life through the learning process carried out is a keyword in the success of 21st-century competency achievement. The learning process in any subject that is carried out should be integrated with the ability to apply entrepreneurial character which contained in the literacy of the industrial revolution era in the 21st century. make innovations in learning that can support the integration of the new literacy era of the industrial revolution that is applied in entrepreneurial-based learning in the digital age [17].

The main reason for analyzing the learning of entrepreneurship in digital age based on new

literacy in the industrial revolution era 4.0 is the emergence of the need for college graduates to be able to survive the digital age by having a new competency set to be able and skilled to become a professional who has critical and creative thinking as a driver of the digital age. Besides the emergence of the problem of the weakening of human interaction with fellow humans as a bias from the use of technology that limits communication and collaboration between fellow humans also becomes one thing to worry about and look for a way out through a learning process that is laden with the inculcation of inter-fellow interaction attitudes [18]. Another reason that is no less important is the emergence of new opportunities in the digital age with the internet of things that cause students to prepare themselves through innovative education based on the new literacy industry revolution 4.0 based on realistic activities in real life to hone the sensitivity of students to recognize the problems in their environment alone.

It is hoped that the recommendations from this analysis need will be a solution that can be offered in integrating learning in the digital age entrepreneurship based on the new literacy era of the industrial revolution 4.0. The integration of cognitive learning and skills into students' curricula can gain a deeper understanding of the subject and try to solve complex problems that occur in the real world [19]. This is a reinforcement that through integrated learning in the real world and solving real-world problems, there will be leadership in problem-solving, able to work well in teams, the ability to read, analyze, and use information. Therefore the relevance between education and work needs to be adjusted to the development of science and technology by taking into account aspects of humanities.

21st-century human resources must have literacy in the industrial revolution era, namely the ability to understand, analyze and construct with the ability to literate data, namely the ability to analyze, use information in the digital world, technological literacy with the ability to recognize and operationalize machine work in technology applications and human literacy with communication skills, collaboration, creativity, critical thinking. This ability will be trained in learning new literacy-based digital entrepreneurship in the industrial revolution era 4.0.

II. METHODE

This research was conducted using a needs analysis model to illustrate the difference between current conditions and students' expectations of techopreneurship competencies in higher education. The survey was conducted at the Faculty of Computer Science, Dharmas Indonesia University. A representative sample was taken based on a random sampling technique with a total sample of 50 students consisting of three study programs that had taken technopreneurship courses.

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Table 1 Research Respondent

Research Sample	Total Respondent
Technical Information	25
System Information	25
Total	50

The research instrument was developed with the Linkert scale of the tested indicator and its reliability and validity to 30 students who were not in the sample. Data were analyzed using SPSS and analyzed using descriptive statistics.

Table 2 Instrumen Of Reliability And Validity

Respondent	Validity	Reliability
30 Student	All item isid	,968

III. DISCUSSION AND RESULT

Stages of needs analysis aim to see the current conditions and the needs of students and lecturers in entrepreneurial learning so that at this stage can describe the discrepancy between the current state and priority/needs of students regarding 21st-century competence and the expected learning process in learning entrepreneurship in education high. The subjects of this study were students at the Faculty of Computer Science, Dharmas University, Indonesia.

Data collection techniques were carried out by distributing questionnaires in the form of a questionnaire that had been tested for the validity

and reliability of the questionnaire. The sample of this need analysis study was 115 students of the Faculty of Computer Science UNDHARI who had taken technopreneurship courses. The draft data collection questionnaire can be seen in Table 3.

Tabel 3. Design of Instruments for Need Analysis of Entrepreneurship Learning in the 21st Century

Indicator	Sub Indicator of Competency
Critical thinking 1. Analyzing	1. Lecturers provide space for students learning process to identify or formulate questions
	2. Students can recognize and distinguish the causes and consequences of scenario
	3. Students can group information into smaller parts to explore patterns or relationships
2. Evaluating	4. Students can to make hypotheses, criticize and test
	5. Provide an assessment of solutions, ideas, and methodologies using suitable criteria or existing standards
3. Creation	6. Competent students make generalizations of an idea or perspective on a problem
	7. Students can design a way to solve problems
Communication 1. Verbal	8. The learning process of the Entrepreneurship course that is developed makes communication that exists between lecturers and students going both ways
	9. Effective interaction patterns can help students improve good grammar skills
2. Nonverbal	10. students can demonstrate and convince what is said
	11. Students can control emotions in communicating
Collaboration 1. Cooperation	12. Students have a positive sense of dependence and are attached to their group members
	13. Students face each other and help each other in achieving learning goals
2. Positive Interaction	14. Group members are responsible for learning the subject and also responsible for the group
	15. The creation of dynamic interactions for mutual learning and learning as collaborative learning
Creativity 1. Fluency	16. Students have the problem planning option to be solved
	17. Students have question options in the learning process
2. Flexibility	18. Students have alternative solutions in one problem
3. Originality)	19. The ability to produce ideas in solving problems
4. Elaboration	20. The ability to generate new ideas without the help of others

After each instrument is prepared, the stages that must be carried out are the assessment of the instruments used by validators who are competent in their fields, before knowing the success of a model and product development that results from these three aspects, namely valid, practical and effective. This activity aims to ensure that the instrument precisely measures or evaluates what is to be assessed and by following per under the aims and objectives of the developed model. From the results of the assessment of 5 validators who have been appointed that the instruments used to measure and assess the success of the development of the model and the products produced are categorized very well in the sense of the word that the instrument agrees to be used or is very feasible to use. Suggestions from several many validators are on aspects of language use, sentence operations and typing rules must be by following per under language guidelines. All suggestions must be corrected before the instrument

is used. Table 4 is the result of expert judgment on the Questionnaire Instruments.

Table 4. Results of Judgment Validity Requirements Analysis Instruments

Expert	Item							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	4	4	4	4	5	5	4	4
2	4	5	5	4	4	5	4	5
3	5	5	4	4	4	5	5	4
4	5	4	5	5	5	5	5	5
5	4	4	4	4	4	4	4	4
Validasi	0.85	0.85	0.85	0.80	0.85	0.95	0.85	0.85
Average	0.86							

Reliability Statistics

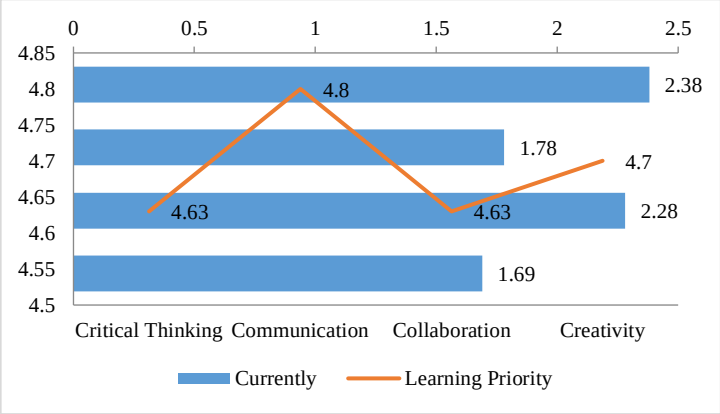
Cronbach's Alpha	N of Items
.773	8

Need analysis is done to examine a phenomenon of the needs of a program. Respondents used in filling out this needs analysis questionnaire were lecturers and students in the Faculty of Computer Science. The questionnaire used in this needs analysis is a collection of information to find out the level of competency achievement of vocational students of the Faculty of Computer Science between current conditions and conditions of expectation. The needs analysis questionnaire uses the dual response survey category with a Likert scale, namely: 1 = Very Good, 2 = Good, 3 = Good enough, 4 = Poor, and 5 = Not Good. Table 5 is the result of filling out the questionnaire conducted by the lecturer.

Table 5 Results of Questionnaire Filling by Lecturers

	21 st Skill (Competence)																			
	Critical Thinking							Communication				Collaboration				Creativity				
Respondent	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
∑ Reality	16	15	17	19	16	16	19	24	25	21	21	17	16	20	18	25	23	20	27	24
Average	1.6	1.5	1.7	1.9	1.6	1.6	1.9	2.4	2.5	2.1	2.1	1.7	1.6	2	1.8	2.5	2.3	2	2.7	2.4
	1.69							2.28				1.78				2.38				
∑ Expectation	43	46	50	47	43	48	47	47	47	49	49	48	46	46	45	45	45	48	47	50
Average	4.3	4.6	5	4.7	4.3	4.8	4.7	4.7	4.7	4.9	4.9	4.8	4.6	4.6	4.5	4.5	4.5	4.8	4.7	5
	4.63							4.80				4.63				4.70				

Based on the results of data analysis at the need analysis stage, it is explained that the priories/needs of lecturers in improving the quality of entrepreneurship learning show that lecturers have high expectations of the learning process. Lecturer expectations of the learning process are expected to improve 21st-century learning competencies, namely critical thinking, communication, collaboration, creativity. Descriptive description between the current situation and student's priority/needs is 2.53 which can be assumed that the lecturer needs an innovative learning model in exploring students' abilities in the learning process. As explained in Figure 3.



Student priorities/needs of the entrepreneurial learning process very high expectations in the entrepreneurial learning process. Students' expectations of 21st-century competencies (collaboration, communication, critical thinking, creativity) are in the high category with an average of 4.6 which means students need to develop learning models that are more effective and efficient in developing their academic potential.

Fig. 3 Need Analysis of Lecturer for the Development of 21st Century Skills

Table 5 Results of Questionnaire Filling by Students

	21 st Skill (Competence)																			
	Critical Thinking							Communication				Collaboration				Creativity				
Respondent	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
∑ Reality	119	101	94	111	122	132	130	143	157	135	132	107	100	127	140	152	91	99	135	135
Average	2.38	2.02	1.88	2.22	2.44	2.64	2.6	2.86	3.14	2.7	2.64	2.14	2	2.54	2.8	3.04	1.82	1.98	2.7	2.7
	2.31							2.84				2.37					2.45			
∑ Expextation	216	212	228	237	214	246	245	238	240	242	221	231	227	221	231	213	234	234	220	241
Average	4.32	4.24	4.56	4.74	4.28	4.92	4.9	4.76	4.8	4.84	4.42	4.62	4.54	4.42	4.62	4.26	4.68	4.68	4.4	4.82
	4.57							4.71				4.55					4.57			

In general, the results of the analysis of the needs analysis that has been done can be illustrated in Figure 4.

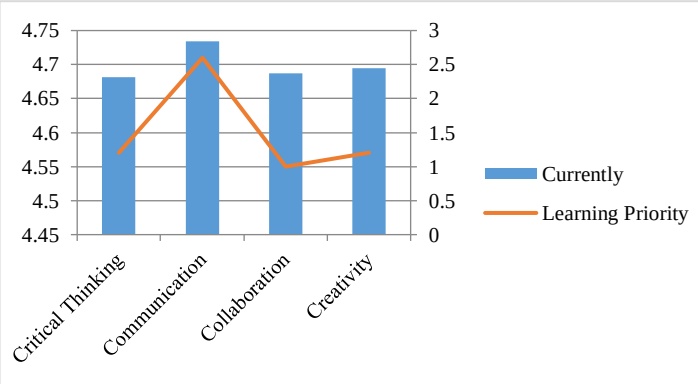


Figure 4 Need Analysis of Lecturer for the Development of 21st Century competencies in technopreneurship

IV. CONCLUSION

The study has been carried out comprehensively through the study of literature, observation and analysis of current learning needs so it can be assumed that a renewal and development of learning models that can respond to current needs, especially in the era of the industrial revolution 4.0, are good participants of innovation skills such as; Critical thinking, Communication, Collaboration, Creativity. Students are expected to be able to have competence and proficiency in the field they are involved in. Besides, it is no less important, students are expected to be able to combine these two competencies in daily life, namely field competence and innovation skills.

Based on the Need Analysis that has been done, it is recommended to develop a learning model that can synchronize current needs and connect the competencies contained in the Higher Education Curriculum based on the Indonesian National Qualification Framework with the competencies issued by the Indonesian National Work Competency Standards. The Higher Education Curriculum (KPT) which is oriented towards life skills or skills requires every student and lecturer to be able to develop creativity, so an appropriate learning model is needed and can provide solutions to the problems faced with it.

Based on a thorough and relevant study it can be concluded and needed an innovation in learning that can increase student motivation and interest in participating in the learning process to make the quality of education and teaching entrepreneurship planned and directed, and relevant to their competencies and the world of industry and society. Entrepreneurship education in universities has a very good impact on the quality of students and college graduates. Entrepreneurship education in vocational is even very important because, in addition to graduates in vocational education having competence, graduates are also required to have good entrepreneurial attitudes and competencies.

REFERENCES

[1] R. Tjandrawinata, “Industri 4.0: revolusi industri abad ini dan pengaruhnya pada bidang kesehatan dan bioteknologi,” Work. Pap. Dexa Medica Gr., 2016.

[2] J. Nizwardi, Tingkat Kepeduian Kepala Sekolah dan Guru Sekolah Menengah Kejuruan Terhadap Perubahan Kebijakan Pendidikan (Studi Kasus Implementasi Kurikulum 2013). Penelitian Guru Besar, Fakultas Teknik Universitas Negeri Padang. 2014.

[3] R. Efendi, A. Yulastri, and Yusran, “Implementation Competency Based Learning Model Of Learning Computer Network Courses At Vocational Education,” J. Adv. Res. Dyn. Control Syst., vol. 11, no. 5, pp. 501–505, 2019.

[4] J. Schumpeter, The Theory of Economic Development. United States: Routledge, 2017.

[5] T. Shindina, Y. Lysenko, and N. Orlova, “Entrepreneurs’ Training in Innovation-Oriented Society,” Procedia - Soc. Behav. Sci., vol. 214, no. June, pp. 1098–1108, 2015.

[6] K. Kereluik, P. Mishra, C. Fahnoe, and L. Terry, “What Knowledge Is of Most Worth,” J. Digit. Learn. Teach. Educ., vol. 29, no. 4, pp. 127–140, 2013.

[7] D. H. Pink, A Whole New Mind: Moving from the Information Age to the Conceptual Age. Riverhead Books, 2005.

[8] H. Gardner, “The Five Minds for the Future,” Schools, vol. 5, no. 1/2, pp. 17–24, 2008.

[9] Craig D. Jerald, “Design and Performance Analysis of Silicon-Germanium Rtg’S,” no. July, pp. 395–399, 1969.

[10] Supratman, S. Defit, and Vitriani, “Indeks Kesiapan Perguruan Tinggi dalam Mengimplementasikan Smart Campus,” J. Teknol. Inf. dan Ilmu Komput., vol. 6, no. 3, pp. 267–276, 2019.

[11] C. Jones and S. Cross, “Is there a Net generation coming to university?,” ALTC 2009 Dreams Begins Responsib. Choice Evid.

Chang. 810 Sept. 2009 Mancheste UK, pp. 10–20, 2009.

[12] C. Jones and R. Ramanau, "Collaboration and the Net generation: The changing characteristics of first year university students," Comput. Support. Collab. Learn. Pract. CSCL 2009 Conf. Proc. - 9th Int. Conf., pp. 237–241, 2009.

[13] B. Trilling and C. Fadel, 21st Century Skills: Learning for Life in Our Times. Wiley, 2009.

[14] Maseleno, A., Huda, M., Jasmi, K. A., Basiron, B., Mustari, I., Don, A. G., & bin Ahmad, R. (2019). Hau-Kashyap approach for student's level of expertise. Egyptian Informatics Journal, 20(1), 27-32.

[15] A. Y. Raimon Efendi, Jalius Jama, "Development of Competency Based Learning Model in Learning Computer Networks," J. Phys. Conf. Ser., vol. 1387, no. 1, pp. 0–6, 2019.

[16] W. Bygrave and A. Zacharakis, Entrepreneurship. 2011.

[17] S. M. Thang, L. Y. Sim, N. Mahmud, L. K. Lin, N. A. Zabidi, and K. Ismail, "Enhancing 21st Century Learning Skills Via Digital Storytelling: Voices of Malaysian Teachers and Undergraduates," Procedia - Soc. Behav. Sci., vol. 118, pp. 489–494, 2014.

[18] E. van Laar, A. J. A. M. van Deursen, J. A. G. M. van Dijk, and J. de Haan, "Determinants of 21st-century digital skills: A large-scale survey among working professionals," Comput. Human Behav., vol. 100, no. July, pp. 93–104, 2019.

[19] S. M. Drake and R. C. Burns, Meeting Standards Through Integrated Curriculum. Virginia USA: Association for Supervision and Curriculum Development, 2004.