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ENTREPRENEURSHIP EDUCATION MODEL IN HIGHER EDUCATION IN THE ERA OF INDUSTRIAL REVOLUTION 4.0

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Abstract

This research aims to formulate an entrepreneurship education model through planning, implementation, implementation and evaluation in developing an entrepreneurship education model, to produce an entrepreneurship education model in higher education in the era of the industrial revolution 4.0 This research was carried out using an eclectic approach using or modifying the Research and Development (Educational Research & Development) design. This research is research that produces products in the form of models, namely models of entrepreneurship education in higher education in the Industrial Revolution Era 4.0. The research approach used is a combination of qualitative approaches to produce the model. The data collection techniques used were interviews, observation, documentation and focus group discussions. Data analysis techniques Data collection, data reduction, data presentation, data verification and concluding research results. The results of this research produce a model of entrepreneurship education in higher education. The application of this model goes through several stages, namely: 1) Planning including graduate competencies and curriculum, 2) Implementation through Theory, Practice and projects which are expected to be able to achieve the competencies of an entrepreneur. 3) Assessment Aspects through Learning Domains, Cognitive (Knowledge), Affective (Skills), Psychomotor (Attitude), 4) this research produces an Entrepreneurship Education Model Based on Planning, Implementation and Evaluation (PIE) in the Era of the Industrial Revolution 4.0.

Keywords: Model, Entrepreneurship Education, Industrial Revolution 4.0.

INTRODUCTION

The increasing density of Indonesia's population is in line with the continued increase in the population in the country. According to the latest Central Statistics Agency (BPS) data, Indonesia's population has now reached 278.69 million people in mid-2023 (BPS, 2023). This number has increased by 1.1% compared to last year's 275.7 million people. When compared to a decade earlier.

The development of entrepreneurship in Indonesia is a necessity considering that currently Indonesia's entrepreneurship rate has only reached 3.47%, which is very far from Indonesia's population when compared to its closest neighboring countries, such as Thailand. currently it is 4.2%, Malaysia has reached 4.7%, Singapore has reached 8.7% (Jurnas.com, 2024). Increasing the entrepreneurship ratio aims to strengthen the national economic structure (Eri Sutrisno, 2022).

Entrepreneurs are not born by themselves but through a process that is not easy and requires the right ecosystem. The entrepreneurial ecosystem is the interrelationship between factors to produce productive entrepreneurship and give birth to new entrepreneurs (Fernandes et al., 2022). In general, the entrepreneurial ecosystem includes at least easy market access, quality human resources, access to capital and financing, supporting networks such as mentors, consultants, incubators, entrepreneurial networks, policies and regulations, training and socialization,

availability of educational institutions, and support factors. socio-cultural (Ostrovska et al., 2021).

Higher education as an educational institution is expected to be able to produce competitive human resources, where higher education is the final terminal in the formal education level (Santana-Domínguez et al., 2022). niversities as executors of the mandate of higher education must be more sensitive and responsive to all changes that occur in society. The changes referred to include the fields of work and/or professions that will be entered by university graduates. This revolution is a challenge that must be answered by higher education. The implementation of learning, including research carried out by university personnel, must be able to answer this disruptive condition.

Seeing the various existing problems, an entrepreneurship education model is needed which starts from preparing a plan consisting of curriculum development, learning program plans, learning activity schedules (Walmsley & Wraae, 2022) (Byun et al., 2018). In the implementation aspect, it can be seen in the methods, models, strategies and approaches used in the learning process by applying the MBKM-based learning model. The learning assessment aspect consists of lecturers, assessment systems, students, input, processes and outputs or products where the expected output is how students can create jobs (Guardia, 2014).

Entrepreneurship education is expected to prepare graduates to have high discipline, commitment, honesty in actions and attitudes, creative and innovative, courageous attitude to take risks, proactive attitude and snacking attitude to create independence (Adeel et al., 2023) (Abdullahi et al., 2022). The research results from (Cascavilla et al., 2022) found that it is related to the balance between teaching entrepreneurship through theory and experimental learning with systematic unstructured practice, so it is necessary to distinguish which elements of entrepreneurship can be taught through theory, and which must be through experience in form of practice (Din et al., 2016).

This research aims to produce a model of entrepreneurship education in higher education in the era of the industrial revolution 4.0 through implementation planning and evaluation.

THEORETICAL BASIS

Entrepreneurship education includes all activities aimed at cultivating entrepreneurial mindsets, attitudes and skills and covers various aspects such as idea generation, start-ups, growth and innovation (Kraus et al., 2023) (Colombelli et al., 2022) (Guardia, 2014). In general, entrepreneurship education aims to increase awareness of entrepreneurship as a career option, and increase understanding of the processes involved in starting and managing a new business enterprise (Mets et al., 2022). In essence, entrepreneurship is the nature, characteristics and character of someone who has the will to creatively realize innovative ideas into the real world (Blankesteijn et al., 2021).

According to (Ostrovska et al., 2021) dan (Susanti, 2014) the entrepreneurship education model in higher education generally implements 5 methods, namely through curriculum, business incubators, entrepreneurship centers, student scientific olympiad competitions, and building entrepreneurial skills and characteristics. by integrating courses and extracurricular activities (Başçı & Alkan, 2015). Although information about entrepreneurship can be learned through education, much of the knowledge

needed is actually obtained from exploring opportunities that can be obtained from learning by doing because entrepreneurial knowledge and skills are mostly obtained from the business environment through induction processes, practical and social experience rather than those obtained in the environment. education (Isiozor, 2020).

The creation of an entrepreneurial mindset and competency is an evolutionary process that combines the dynamics of knowledge exploitation and exploration mechanisms (Ndou, 2021). Technical knowledge and skills as well as practical experience in entrepreneurship need to be implemented in order to adapt to developments and challenges in the business world (Colombelli et al., 2022). Teaching Methods in Entrepreneurship Education according to (Amofah & Saladrigues, 2022). classifies teaching methods into the following categories: Case studies, group discussions, individual presentations, individual written reports, group projects, formal lectures, guest speakers, action learning, seminars, web-based learning, recorded videos. However, according to (Isiozor, 2020) there are different views that there are many ways to offer entrepreneurship education, depending on the objectives of the education. If the goal of education is to increase understanding of what entrepreneurship is then the most effective way to achieve this goal is to provide information through public channels such as the media, seminars, or lectures.

Based on the results of research from (Amofah & Saladrigues, 2022) especially in the realm of attitudes, apart from the learning methods, role models and the attitudes or behavior of teaching staff are required. To teach and develop an entrepreneurial culture in students, it seems that the three domains are dominated by the affective or attitudinal domain with the minimum level of ability achieved being internalized and even becoming their own character. Students must be given materials that motivate them to become entrepreneurs, provide skills to find business ideas by pouring them into a good business plan, how to market their products both online and offline so that the business they run can run according to plan (Olutuase et al., 2023).

Education 4.0 is an approach, strategy, method, model implemented in learning that is in line with the Industrial Revolution 4.0 where this education focuses on artificial intelligence, robotics, smart technology; which are applied and influence our daily lives. Technology that previously was only a simple computer application has now become thousands of technologies that cannot be caught up by educators (Aribisala & Igweh, 2022).

Education theorists often refer to Industrial Revolution Era Education 4.0 to describe various ways of integrating cyber technology both physically and non-physically in learning. Education in the Industrial Revolution Era 4.0 is a phenomenon that responds to the needs of the industrial revolution by adapting the new curriculum to the current situation. This curriculum is able to open a window to the world through the palm of your hand, for example by utilizing the internet of things (IOT). On the other hand, teachers also get more references and teaching methods.

METHODOLOGY

This research is educational research and development which has various models. Development models can be in the form of procedural models, conceptual models, and theoretical models. Research and development in the context of education, until now various models of research and development have developed, known as various

models of research and development of educational systems, models, processes, materials and/or devices.

This research is research that produces a model, but first we will briefly explain the structure of the model used as a basis for developing the model. Because this model is adapted from an existing model, the reasons for choosing the model will be explained, the components adapted, the strengths and weaknesses of the model compared to existing models. The resulting model is a model of entrepreneurship education in universities in the Industrial Revolution Era 4.0.

The research instrument used in this research is a procedural model where the model is descriptive, namely outlining the steps that must be followed to produce a product (Setyosari, 2016), where the characteristics of the procedural model are positivistic, with a systematic serial sequence. In this development, a procedural development model is used, where apart from producing procedural development products, it also produces product components to be developed and their relationships with these components. The aim of this research is to produce a product where the product produced already exists, and the product is made to be perfected, so that it can be used to support the course of the entrepreneurial learning process in higher education.

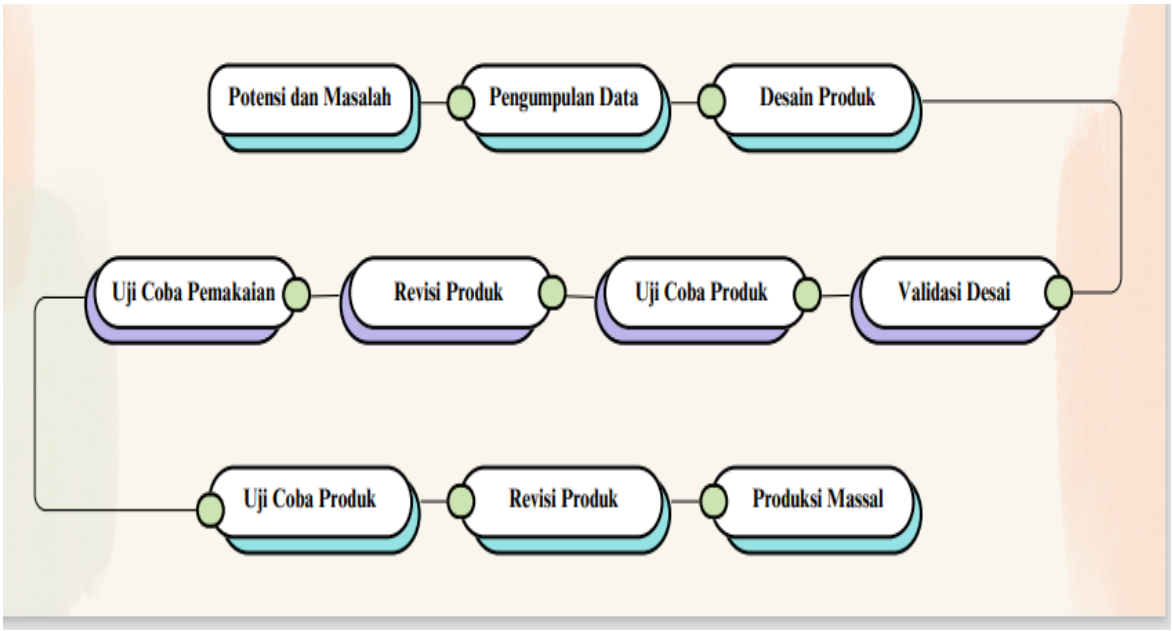

Figure 1: Development Model Source: Sugiyono, 2016

The procedural development model in this research refers to the development model from (Sugiyono, 2016) which has been mentioned above, however in this research not all development steps were implemented, this is because the research carried out was still on a limited scale and did not include development research.

RESEARCH RESULTS AND DISCUSSION

The entrepreneurship education model that is developed through planning is from determining graduate competencies and preparing the curriculum, from the implementation of entrepreneurship education learning which is carried out by learning in the form of providing theory, practice and projects, while from the evaluation side more emphasis is placed on the skills aspect (Technical skills, Conceptual Skills, Managerial Skills, Human Relations Skills, Decision Making Skills, Technology Skills,

Marketing Skills, Financial Skills, Initiative & Enterprise Skills, Time Managerial Skills (Fekri et al., 2012). Self and for the knowledge aspect the emphasis is on Understanding business opportunities, Understanding Production Processes, Managerial Understanding, Marketing Understanding, Understanding Financial Management, Understanding Latest Technology, Understanding Processes (Cascavilla et al., 2022).

The key is that entrepreneurship education must begin with the formation of an entrepreneurial mindset, followed by the formation of creative and innovative behavior in order to be creative. The creations that entrepreneurs can produce include creation of wealth, enterprise, innovation, change, employment, value and growth (Fernandes *et al.*, 2022). In line with research (Sohar University *et al.*, 2021), implementation of entrepreneurship education in higher education still needs improvement, especially in teaching methods and learning organization. Teaching methods in entrepreneurship education in higher education must be developed not only within the framework of knowledge development, but must also be directed at project-based learning which allows students to explore their business environment (Colombelli et al., 2022).

The following is a model of entrepreneurship education in universities in the era of industrial revolution 4.0

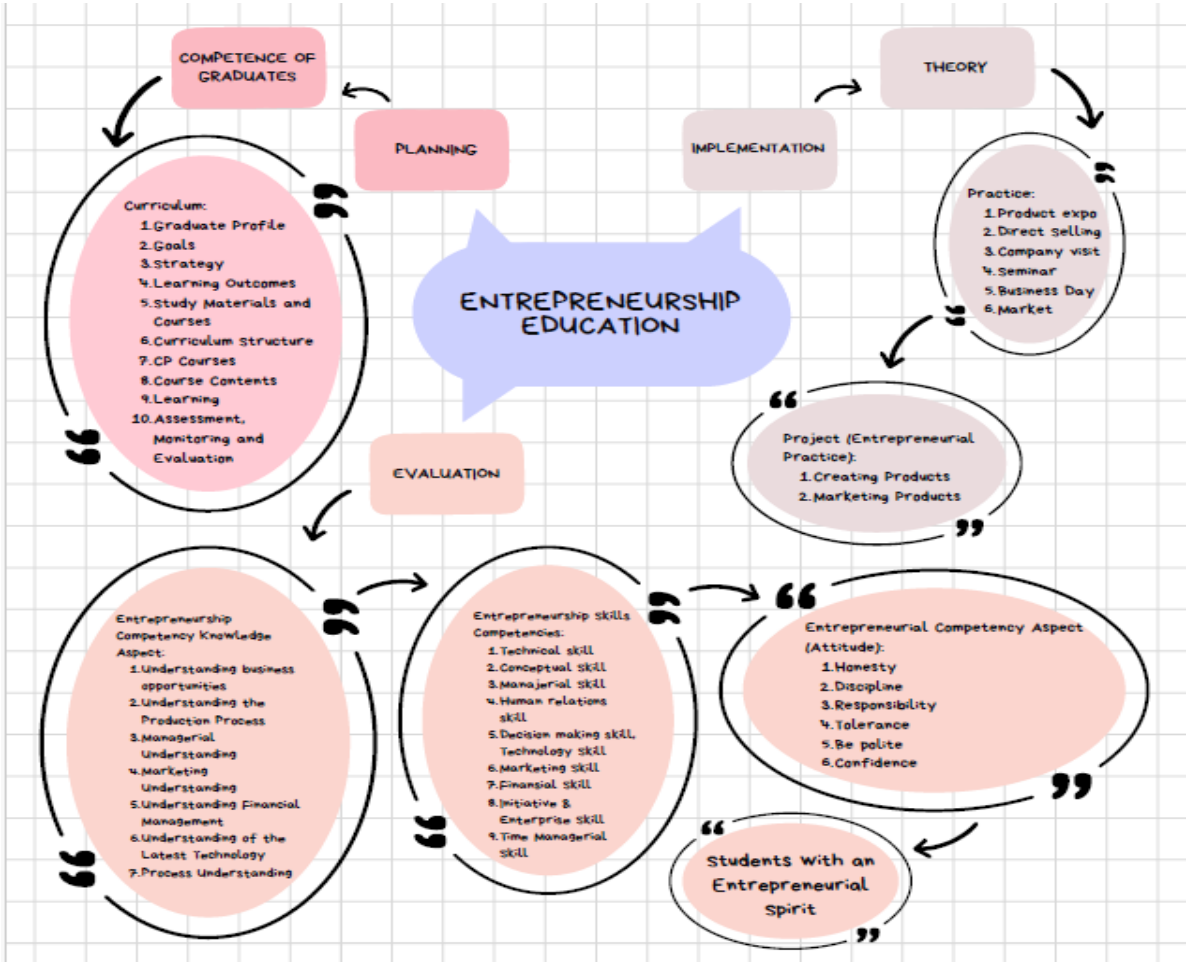

Figure 2: Entrepreneurship Education Model based on Planning, Implementation and Evaluation (PIE) in the Era of Industrial Revolution 4.0

Source: Data processed, 2024

To effectively implement the PIE model of entrepreneurship education in the Industrial Revolution 4.0 era, there are several key elements that need to be considered.

1. Integrate direct learning experiences into the curriculum. This can be achieved through internships, mentorship programs, and real-world projects (Bellotti et al., 2012) . By engaging in these activities, students can gain hands-on experience in entrepreneurship and develop the skills necessary to navigate the complex business landscape.
2. Entrepreneurship education must foster an entrepreneurial mindset and encourage students to think outside the box. This can be achieved by promoting a culture of innovation, encouraging experimentation, and teaching students how to accept failure as a learning opportunity (Saad & Alalwany, 2015). In a rapidly changing world, entrepreneurs must be agile and adaptable, constantly seeking new opportunities and adapting their strategies to remain competitive (Magasi, 2022).
3. Entrepreneurship education must also emphasize the importance of ethical considerations and social responsibility. Along with technological advances, entrepreneurship has a significant impact on society and the environment. By instilling ethical values and social responsibility in students, entrepreneurship education can produce entrepreneurs who not only create successful businesses but also make positive contributions to society. (Ndou, 2021).

Entrepreneurship education is very important in the Industrial Revolution 4.0 era because it equips individuals with the skills and mindset needed to direct students in running a business with rapidly changing developments in science and technology (Fekri et al., 2012) . By integrating practical experience, cultivating an entrepreneurial mindset, and emphasizing ethical considerations, entrepreneurship education can prepare students for success in the Industrial Revolution 4.0 (Al-Mamary & Alraja, 2022).

In the era of the industrial revolution 4.0, character building for entrepreneurs includes being intelligent, trustworthy and creative, including efforts to improve the 5C aspects (creative, cognitive, collaborative, competence, cohesiveness) and being able to produce a generation of digitalpreneurs (Anggia Sari Lubis et al., 2019). Digitalpreneurs are business people engaged in information and communication technology. Entrepreneurial education is needed by students by developing their skills in using social media which can create a business opportunity through online business. Using their knowledge for positive and profitable things (Kraus et al., 2023). By building the character of an entrepreneur which includes creative, cognitive, collaborative, competent and integrated.

CONCLUSION

This research produces a model of entrepreneurship education in higher education through a cycle of planning (determining graduate competencies and preparing the curriculum), implementation (theory, practice and projects), evaluation (knowledge, skills and attitudes), resulting in a model of entrepreneurship education in higher education in the era of the industrial revolution. named the PIE (Planning, Implementation and Evaluation) entrepreneurship education model. The PIE model is a comprehensive approach to entrepreneurship education that emphasizes the importance of careful planning, effective implementation, and rigorous evaluation.

Bıblıography

1) Abdullahi, A. O., Egwakhe, A. J., Akande, F. I., & Umukoro, E. J. (2022). *Entrepreneurship Education And Venture Creation: Experiential Learning Role*. https://doi.org/10.5281/ZENODO.6605212

2) Adeel, S., Daniel, A. D., & Botelho, A. (2023). The effect of entrepreneurship education on the determinants of entrepreneurial behaviour among higher education students: A multi-group analysis. *Journal of Innovation & Knowledge*, *8*(1), 100324. https://doi.org/10.1016/j.jik.2023.100324

3) Al-Mamary, Y. H. S., & Alraja, M. M. (2022). Understanding entrepreneurship intention and behavior in the light of TPB model from the digital entrepreneurship perspective. *International Journal of Information Management Data Insights*, *2*(2), 100106. https://doi.org/10.1016/j.jjimei.2022.100106

4) Amofah, K., & Saladrigues, R. (2022). Impact of attitude towards entrepreneurship education and role models on entrepreneurial intention. *Journal of Innovation and Entrepreneurship*, *11*(1), 36. https://doi.org/10.1186/s13731-022-00197-5

5) Anggia Sari Lubis, Yeni Absah, & Prihatin Lumbanraja. (2019). *Human Resource Competencies 4.0 For Generation Z*. https://doi.org/10.5281/ZENODO.3375458

6) Aribisala, O. O., & Igweh, A. O. (2022). *Students' Competence and Attitude towards Entrepreneurship among Business Education Students in Federal College of Education (Technical), Akoka, Lagos*. https://doi.org/10.5281/ZENODO.6835145

7) Bellotti, F., Berta, R., De Gloria, A., Lavagnino, E., Dagnino, F., Ott, M., Romero, M., Usart, M., & Mayer, I. S. (2012). Designing a Course for Stimulating Entrepreneurship in Higher Education through Serious Games. *Procedia Computer Science*, *15*, 174–186. https://doi.org/10.1016/j.procs.2012.10.069

8) Blankesteijn, M., Bossink, B., & Van Der Sijde, P. (2021). Science-based entrepreneurship education as a means for university-industry technology transfer. *International Entrepreneurship and Management Journal*, *17*(2), 779–808. https://doi.org/10.1007/s11365-019-00623-3

9) Byun, C.-G., Sung, C. S., Park, J. Y., & Choi, D. S. (2018). A Study on the Effectiveness of Entrepreneurship Education Programs in Higher Education Institutions: A Case Study of Korean Graduate Programs. *Journal of Open Innovation: Technology, Market, and Complexity*, *4*(3), 26. https://doi.org/10.3390/joitmc4030026

10) Cascavilla, I., Hahn, D., & Minola, T. (2022). How You Teach Matters! An Exploratory Study on the Relationship between Teaching Models and Learning Outcomes in Entrepreneurship Education. *Administrative Sciences*, *12*(1), 12. https://doi.org/10.3390/admsci12010012

11) Colombelli, A., Loccisano, S., Panelli, A., Pennisi, O. A. M., & Serraino, F. (2022). Entrepreneurship Education: The Effects of Challenge-Based Learning on the Entrepreneurial Mindset of University Students. *Administrative Sciences*, *12*(1), 10. https://doi.org/10.3390/admsci12010010

12) Din, B. H., Anuar, A. R., & Usman, M. (2016). The Effectiveness of the Entrepreneurship Education Program in Upgrading Entrepreneurial Skills among Public University Students. *Procedia - Social and Behavioral Sciences*, *224*, 117–123. https://doi.org/10.1016/j.sbspro.2016.05.413

13) Eri Sutrisno, 2022. (n.d.). *Https://indonesia.go.id, 2022*. https://indonesia.go.id/2022

14) Fekri, K., Shafiabady, A., Nooranipour, R., & Ahghar, G. (2012). Determine and Compare Effectiveness of Entrepreneurship Education based on Multi- Axial Model and Theory of Constraints and Compromises on Learning Entrepreneurship Skills. *Procedia - Social and Behavioral Sciences*, *69*, 566–570. https://doi.org/10.1016/j.sbspro.2012.11.447

15) Fernandes, C., Ferreira, J. J., Veiga, P. M., Kraus, S., & Dabić, M. (2022). Digital entrepreneurship platforms: Mapping the field and looking towards a holistic approach. *Technology in Society*, *70*, 101979. https://doi.org/10.1016/j.techsoc.2022.101979

16) Guardia, D. L. (2014). *A Game based Learning Model for Entrepreneurship Education*.

17) Isiozor, G. N. (2020). *Management Tasks And Challenges Of Entrepreneurship Education For Sustainability Of Universities In Imo State, Nigeria*. https://doi.org/10.5281/ZENODO.3762750

18) Kraus, S., Vonmetz, K., Bullini Orlandi, L., Zardini, A., & Rossignoli, C. (2023). Digital entrepreneurship: The role of entrepreneurial orientation and digitalization for disruptive innovation. *Technological Forecasting and Social Change*, *193*, 122638. https://doi.org/10.1016/j.techfore.2023.122638

19) Magasi, C. (2022). The influence of entrepreneurship education on entrepreneurial intentions: Perception of higher business education graduates. *International Journal of Research in Business and Social Science (2147- 4478)*, *11*(2), 371–380. https://doi.org/10.20525/ijrbs.v11i2.1701

20) Mets, T., Raudsaar, M., Vahejõe, K., Kaseorg, M., & Vettik-Leemet, P. (2022). Putting Entrepreneurial Process Competence into the Focus in Entrepreneurship Education: Experience from Estonian Universities. *Administrative Sciences*, *12*(2), 67. https://doi.org/10.3390/admsci12020067

21) Ndou, V. (2021). Social Entrepreneurship Education: A Combination of Knowledge Exploitation and Exploration Processes. *Administrative Sciences*, *11*(4), 112. https://doi.org/10.3390/admsci11040112

22) Olutuase, S. O., Brijlal, P., & Yan, B. (2023). Model for stimulating entrepreneurial skills through entrepreneurship education in an African context. *Journal of Small Business & Entrepreneurship*, *35*(2), 263–283. https://doi.org/10.1080/08276331.2020.1786645

23) Ostrovska, H., Tsikh, H., Strutynska, I., Kinash, I., Pietukhova, O., Golovnya, O., & Shehynska, N. (2021). Building an effective model of intelligent entrepreneurship development in digital economy. *Eastern-European Journal of Enterprise Technologies*, *6*(13 (114)), 49–59. https://doi.org/10.15587/1729-4061.2021.244916

24) Saad, F., & Alalwany, H. (2015). *Creating Entrepreneurial Universities: The Swedish Approach of Transformation*. *9*(8).

25) Santana-Domínguez, I., Ballesteros-Rodríguez, J. L., & Domínguez-Falcón, C. (2022). An application of training transfer literature to the analysis of training for entrepreneurship: A conceptual model. *The International Journal of Management Education*, *20*(2), 100649. https://doi.org/10.1016/j.ijme.2022.100649

26) Setyosari, (2016). *Motode Penelitian dan Pengembangan Pendidikan* (Edisi 4). Prenadamedia Grup. https://books.google.co.id/

27) Sohar University, Al.badi, Y., Al.alwi, R., Sohar University, Khan, F., & Sohar University. (2021). Unravelling the conundrum: Are Entrepreneurship Education and Personality Traits Influential for Entrepreneurial Intentions in University Students. *International Journal of Research in Entrepreneurship & Business Studies*, *2*(4), 23–36. https://doi.org/10.47259/ijrebs.243

28) Sugiyono, 2016. (n.d.). *Metode Penelitian Kuantitatif, Kualitatif Dan R&D*. Penerbit Alfabeta , 2016. https://library.nusaputra.ac.id:443/index.php?p=show_detail&id=981

29) Susanti, M. H. (2014). *Model Pendidikan Kewirausahaan Di Perguruan Tinggi Dalam Menumbuhkan Entrepreneur Muda Kreatif Dan Inovatif Di Kota Semarang*. *41*(1).

30) Walmsley, A., & Wraae, B. (2022). Entrepreneurship education but not as we know it: Reflections on the relationship between Critical Pedagogy and Entrepreneurship Education. *The International Journal of Management Education*, *20*(3), 100726. https://doi.org/10.1016/j.ijme.2022.100726