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Research paper

Designing of Technopreneurship Scientific Learning Framework in Vocational-based Higher Education in Indonesia

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Abstract

The complexity of problems at work and high working demands require students to develop multiple skills. One of the alternatives for encountering those conditions is through the process of Entrepreneurship activities or training, especially in vocational-based higher education and other public higher education. This paper aims to present designing process of technopreneurship scientific learning framework in vocational-based higher education. The research used Four D Model (4-D model) which followed stages of 1) Define, 2) Design, 3) Develop, and 4) Disseminate. While in this preliminary research, the stages were conducted only up to the design phase. The framework of technopreneurship scientific learning model resulted consists of, 1) identified problems, needs analysis and learning analysis; 2) scientific technopreneurship cooperative approach; 3) design of the scientific technopreneurship business plan; 4) product (prototype of goods and/or services), and 5) work evaluation. The results elaborate that thetechnopreneurship scientific learning model is as an alternative to producing well-prepared graduates for survival in the society by applying the entrepreneurship skills-based technology.

Keywords: *Learning Model, Technopreneurship, Vocational-based higher Education.*

1. Introduction

Higher education serves to develop the ability, character, civilization and dignity of the nation to create a quality and competitive generation (1). Supporting these objectives, the quality learning process is required to be excellent. One of the components is a learning model that ensures effective and efficient learning (2). However, the learning model regularly needs improvement by the time as the effort of adapting the current situations.

In line, a learning model for learning entrepreneurship still needs improvement. The improvement is not only for adapting the current condition but also finding the appropriate learning model applied in the entrepreneur class. Since it encounters many obstacles and difficulties in its application and has a bad impact on output quality, and outcomes of college graduates. Constraints on the Learning entrepreneurship model at higher education are students are bored during the learning process. It is due to the implementation of theory and practice in the field is irrelevant (3). In addition, the most college graduates mindset is "finding a job" not "creating jobs". This fact could be caused by the learning orientation and or learning systems at various universities which have not focused on producing graduates who are ready to create jobs (4). If this condition is left ignored, the higher education will certainly contribute to the increasing number of intellectual unemployment. Based on data from the Indonesian (5), the unemployment rate of university graduates started in February 2016 was 7.02 million people or 5.5 percent. This number increased in August 2016 that there were 7.03 million people or 5.61 percent. Although the number of the unemployment rate of university graduates decreased in February 2017, 6.68 million people or 5.33 percent (6), it is still worrying.

The development of higher education should be complemented by high Entrepreneurship competence in handling educated unemployment (7). Supporting that demands, learning entrepreneurship model becomes one of the alternative solutions. It can be relevant to higher education through the implementation of the Technopreneurship Scientific Learning Model. In the Technopreneurship Scientific Learning Model, the students are trained to carry out activities of observing, trying out, communicating and being able to produce products which contain elements of technology. Besides, students are facilitated to think creatively, analyze and produce (8-9). Consequently, this learning model is appropriate to be applied in higher education so that students can master the entrepreneurship activities with the concept of learning by doing. Due to the importance of equipping higher education graduates with Entrepreneurship competence, this research attempt to describe and explore the design of an appropriate entrepreneurship learning model in vocational-based higher education, in particular explaining the framework of the Technopreneurship Scientific Learning Model.

2. Literature Review

2.1 Entrepreneurship in Higher Education

Learning Entrepreneurship (9,10-13) is the process of facilitating individuals with the concepts and skills in order to be able to recognize business opportunities insightfully, with confidence and the ability to act (14). Teaching entrepreneurship aims to inspire, evoke emotion and change the mindset of students (15). Learning Entrepreneurship basically helps the learners to understand why some businessmen are able to see the opportunities that are eco-

nomically beneficial while others do not. This concept greatly assists learners in actual to face problems related to entrepreneurship issues, especially entrepreneurship in vocational-based higher education (16). According to Ghoshal (17), an effective way of teaching entrepreneurship requires a combination of theory and application.

Research on the learning entrepreneurship model has been done by Kurowska-Pysz(18). Meanwhile research on Technopreneurship Scientific Learning model is very little. Simply, scientific technopreneurship is interpreted as where the students are trained to carry out activities of observing, trying, communicating and being able to produce products which contain elements of technology. The products produced by the students can be in the form of goods and or services related to the topic of learning materials. The resulted products must have commercial potential and contain elements of technology so that it can provide business opportunities for students. In learning model which is equipped with syntax or implementation sequences, this step will be a Technopreneurship Scientific Learning Model.

2.2 Scientific Technopreneurship Learning Model

The model is a conceptual framework that is arranged in a logical and systematic sequence as a guide in conducting an activity. According to Joyce (19), learning model is a plan or a pattern that is used as a guide to learning in the classroom or instructional tutorials. The learning model is also used to determine learning tools such as books, movies, tape recorders, computers, curriculum, and so forth. Research on the Entrepreneurship model has been done by Kurowska-Pysz(18); however, specifically on the Technopreneurship Scientific Learning model is less.

3. Development Procedure of the New Model

This research was using research and development approach. According to Putra (20), methods of research and development is the research that deliberately, systematically, aims to formulate the findings, repairing, developing, producing, and testing the effectiveness of products, models, methods, strategies in the way of a particular procedure, service, superior, new, effective, efficient, and meaningful.

Development of the model used was a 4-D model (Four D Model). As elaborated by Thiagarajan et al. (21), it is following stages of: [1] Define, [2] Design, [3] Develop, and [4] Disseminate. In this preliminary study, the stage was limited only up to the design stage.

4. Defining learning entrepreneurship at vocational-based higher education

Define stages was conducted to identify the learning needs of learning entrepreneurship problems in the vocational-based higher education Commissioner. This stage is a need analysis and learning needs analysis on the learning entrepreneurship at vocational-based higher education. This analysis included an analysis of learning tools, teaching materials, especially media and learning resources, entrepreneurial learning, characteristics of learners and infrastructure conditions and ability of educators to obstacles encountered during the study.

This activity was done by conducting interviews and field observations. The purpose of the interviews and field observations is to know what learning entrepreneurship model already applied and what obstacles occur. The respondents are students who are taking a study of entrepreneurship in higher education Commissioner. Methods of analysis which is used is descriptive analysis, it aimed to provide an overview of the learning conditions of entrepreneurship in vocational based higher education Commissioner.

Based on interviews and field observations to several universities, it was found that several events related to Learning entrepreneurship including; 1) learning pattern is still dominantly teacher-centered or lecturers do not give students the opportunity to expand, 2) the results of learning activities are still limited to theoretical learning test and also theoretical practice, 3) strategies, models and approaches is still learning lectures and assignments, 4) handbook as a lecturer and module supporting Learning entrepreneurship on most of the campus does not provide. Therefore, it also raises an urgency to design a Learning entrepreneurship module that is able to facilitate students learning independently.

In addition, interviews were conducted with some students. It obtained information such as 1) most students expect learning entrepreneurship can be a fun learning and challenging and they can acquire a range of knowledge and experience. In fact, learning becomes very tedious when professors do not teach them attractively, 2) some students from other universities have started to implement learning entrepreneurship slightly better through the end of the study. The lecture conducts case studies and writing reports the results of case studies as well as providing an alternative solution to the problem which is found. Then, there also has been directed to creating and delivering products that have commercial potential, as some vocational majors and vocational education as well as in some of the polytechnic. In addition, learning entrepreneurship, which is very monotonous and centred on the lecturer, needs to be addressed by the activities of Learning entrepreneurship which is oriented to produce products that have commercial potential as the reference of learning outcomes quality (13).

Table 1 Researchers' and Scholars' Perspectives towards Framework and Conceptual Model of learning entrepreneurship.

Author (Year)	Framework and Conceptual Model of Learning entrepreneurship
1. (22)	A conceptual model of entrepreneurship as firm behaviour
2. (23)	Learning entrepreneurship: a conceptual framework.
3. (24)	the life-story approach in researching Learning entrepreneurship : the development of a conceptual model
4. (25)	A dynamic model of Learning entrepreneurship
5. (26)	Learning entrepreneurship : a practical model from the creative industries
6. (27)	Learning entrepreneurship : a narrative-based conceptual model
7. (28)	The process of Learning entrepreneurship : A conceptual framework
8. (29)	Learning entrepreneurship : A conceptual framework for technology-based enterprise
9. (30)	From craft to science: Teaching models and learning
10. (31)	A framework for Learning entrepreneurship : A tribute to Jason Cope
11. (32)	Learning entrepreneurship Model in STIEBBANK Yogyakarta-Indonesia.
12. (33)	Learning entrepreneurship Model in Higher Education

Sources: (22-33)

All Perspectives toward a Framework and Conceptual Model of Learning entrepreneurship contribution is an input to the development of a basic model of learning entrepreneurship that was developed. The perspective of the researcher about the Learning entrepreneurship model is still general, except according to the Rae (29) who describes the Learning entrepreneurship as a conceptual framework for the technology-based enterprise that specifically discusses its relationship with social learning perspective. So the researchers then could develop a more Learning entrepreneurship model which is different. Technopreneurship Scientific Learning model as one of the alternatives solutions could be designed.

5. Designing of Technopreneurship Scientific Learning Model

Theoretically, learning entrepreneurship that is well managed indeed gives a very positive effect for the students, especially in the development of their soft skill competencies (34). Inversely, learning entrepreneurship which is not well managed leads tendency of students' being bored and not interested in learning. Therefore, at this stage, first activity was to define the main concepts of the model design study to be integrated into the subject matter and set a course that will be the subject of research. Then, the redesign Technopreneurship Scientific Learning model was carried out. At this stage, the initial framework generated Technopreneurship Scientific Learning model based on needs analysis.
The design of learning entrepreneurship model produces syntax or stages that can be applied in the learning process at Vocational Education and Training (VET) is as same as other public higher education. The syntax or production-based learning stages which was integrated into Technopreneurship Scientific Learning model consists of, 1] Finding Problems, Needs Analysis and Learning Analysis; 2] implementing Scientific Technopreneurship cooperative approach; 3] Designing scientific technopreneurship business plan; 4] Making the product (prototype of goods or services); 5] Evaluating the work.

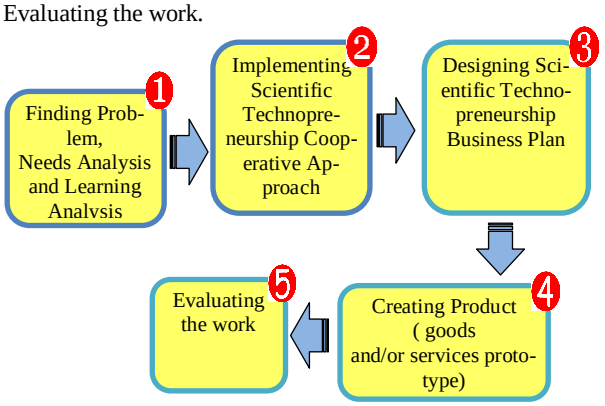

Figure 1. Technopreneurship Scientific Learning model Framework

Based on the framework above, it can be described as follows:

Phase 1; Finding Problems, Needs Analysis and Learning Analysis

Exploration of problems is important at first step. Learners can make observations as a group in the field, industry, community and also can discuss and obtain information from groups or people who need problems (35). Problems encountered can certainly be found a solution, including complex learning problems. The search for such solutions should be able to involve technological elements. Problems identified and tested by alternative formulated solutions, and then it is the birth of the embryo and the early stages of the business. As the analysis of this requirement, it needs to see how needs alternative solutions offered to be able to provide usefulness to society. In addition, analysis of Learning entrepreneurship in higher education, vocational and other public higher education were undertaken to look at the facilities, infrastructure, support references, and the readiness of the students in learning (36). Needs analysis in the community and learning curriculum were to see the synchronization between students' competencies and competency with technology elements so that the resulting solution appropriate and beneficial (37).

Phase 2; Scientific Technopreneurship Cooperative Approach

After obtaining information on the problems and alternatives of the overview solution obtained, the discussions were conducted in groups of 4-5 people. Group discussions were aimed to technopreneurship approaches which were trying to find alternative solutions, technology-based business opportunities, technological elements that are implemented should not be in terms of products and or services, but also from aspects of marketing, distribution and sales. It means that all business processes from up to bottom integration opportunities and technology internalization should be considered. The scientific technopreneurship cooperative approach is not just a simple group discussion activity, but students are led to try to solve the problem and find various references related to the business development of the problems found in the field. In addition, this activity is also better to train high-order thinking skills.

Phase 3; the Design of the Scientific Technopreneurship Business Plan

At this stage, students are invited to design a business plan based on the problems found in the field and trying to find new ideas and innovative solutions. The business plan still designed as part of the Technopreneurship Scientific Learning Model. Students who design business plan follow the value of technology-based innovation.

Phase 4; Creating the Product (Goods and/or Services Prototype)

In the form of prototypes of goods and products or services designed, it must have commercial potential because the second and third stages have been done related analysis products to be designed. Products designed do not have to use high technology, but tend to have quality art. Thus, deep exploration and innovation need to produce innovations that have the highest potential commercial value. The use of low technology with a touch of art and high beauty lead to different benefits and strengths.

Phase 5; Evaluation of the Work

Evaluation of the work is very important to look the compatibility between what was done with the aim of workmanship. In addition, the evaluation work was carried out thoroughly to see the consistency of each stage, especially in generating Technopreneurship scientific business plan and products. Implementation of Technopreneurship Scientific Learning model in higher education towards the students gave the effect of mindset changing of job seekers to job creators. Educators in the implementation of Technopreneurship Scientific Learning model act as a facilitator, coordinator, mediator and motivator of learning activities for students. So, they are indirectly owned Entrepreneurship character, which includes unyielding, hard working and always innovating. The work produced by students and educators can be recorded. If the product has already passed the feasibility test, it is possible to obtain intellectual property rights. So as to produce a superior product and innovating entrepreneurs must go through in-depth surveys and observation of market conditions. So, it can find problems that would be a pathway to have a great opportunity to create new businesses with technological elements (38-44).

6. Conclusion and Recommendation

The Technopreneurship Scientific Learning model is an alternative model of learning entrepreneurship in accordance with the needs of Vocational Education and Training (VET) and other public higher education. Furthermore, through Technopreneurship Scientific Learning Model, the student can study entrepreneurship and recognize the Entrepreneurship character. In addition, the Technopreneurship Scientific Learning model is the recommended way to developing higher-order thinking skills. Entrepreneurship activities also help learners preparing themselves when graduating the college and had an unyielding spirit in the world of work.

From the research, it can be recommended to educators in higher education students could apply the Technopreneurship Scientific Learning Model.

7. Conflict of interest

The author declares no conflict of interest.

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