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IMPACT OF INDUSTRY 4.0 CONTENT IN ENTREPRENEURSHIP IDEATION CLASSES

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Abstract

Industry 4.0 has been an interesting topic for researcers, and it has been investigated in numerous points of view. One of the points of view is the impact of industry 4.0 in the entrepreneurial world, and how the higher education put some anticipation actions on it. Adding the industry 4.0 materials into the entrepreneurship content is one of the efforts that is being done to give the industry 4.0 perspective for the students. This study aims to see the impact of the industry 4.0 materials inside the entrepreneurship content in the entrepreneurship ideation courses. The results show that although the lecturers are quite familiar with the industry 4.0 term, some of them did not quite fluent in it. This has further impact to how they deliver the materials to the students, and how the students perceive the materials as the support to develop their business ideas.

INTRODUCTION

Industry 4.0 has been considered as an interesting topic of discussion. Industry 4.0 is seen as an interesting topic for many researchers to become the object of research, from various points of view (Hizam-Hanafiah et al., 2020; Raj et al., 2019; Zheng et al., 2021), including in the entrepreneurship point of view(Ferreira & Lisboa, 2019; Noerhartati et al., 2019; Rubanov et al., 2019).

The development in this 4.0 spirit has been accelerated by the pandemic (Nachit & Belhcen, 2020) that has pushed the world to be adapted with the current condition. The education field is no exception, as part of the world that should also adapt to the currenct conditions, including by using online education (Azevedo & Azevedo, 2020; Cone et al., 2022).

Apart from the pandemic conditions, universities as the culmination point of education, have completeny understood and start to view industry 4.0 as an

inseparable part of higher education (Pratita et al., 2020). The thought has been implemented by incorporate elements of industry 4.0 into the curriculum, both in the form of courses that specifically discuss industry 4.0 in various variations (Lukita et al., 2020), to snippets of elements of industry 4.0 into certain courses as part of the discussion.

Entrepreneurship courses are known as compulsory subjects in almost all universities as part of higher education awareness to form an entrepreneurial mindset for students. (Cui et al., 2021). Incorporating elements of 4.0 is seen as an effort to bring students to better understand technological developments, with industry 4.0 in it (Hidayat & Yunus, 2019; Wahl & Munch, 2021).

The Industry 4.0 phrase has become a phrase that is being discussed in various conditions, and then it becomes a common awareness (Prasetyo & Sutopo, 2018**).** Industry 4.0 itself is simply a continuation of the 3.0 industrial revolution that priorly existed, where in industry 4.0 there was a shift from a "manual" world that still requires a lot of human intervention to become "automatic" which is run by digital technology. (Zakoldaev et al., 2019).

Briefly, industry 1.0 was started around the 1780s with the introduction of hydropower and steam which helped in mechanized production and greatly improved the agricultural sector, which was continued by the existence of Industry 2.0 that was being defined as the period when mass production was introduced as the main aspect of production, in general.

Industry 3.0 was emerged with the emergence of the Digital Revolution which is more familiar than Industry 1.0 and 2.0 because most people that are living today would be more familiar with industries that rely on digital technology in production. The revolution moves on and it was continued by the Industry 4.0 that has brought changes in many fields. People have always been obliged to learn new daily tasks yet, they are now also forced to use high-tech gadgets which are fastly becoming the most important factor in their work life. (Tay et al., 2018).

The transition from the industrial revolution (the 3.0) to industry 4.0 is considered as very important condition, and to face that, various efforts are needed to prepare for the arrival of this revolution (Suwardana, 2018). International companies that have applied the concept of continuous improvement and have high standards of research and development, have accepted the concept of Industry 4.0 and make themselves more competitive in the market (Tay et al.,

2018).

This fourth industrial revolution and the digital transformation that forms the background, known as Industry 4.0, is growing rapidly. The digital revolution is fundamentally reshaping the way individuals live and work, and the public remains optimistic about the opportunities Industry 4.0 offers for sustainability (Ghobakhloo, 2020).

Industry 4.0 itself is considered to have the potential to bring enormous changes, ranging from faster product development, more flexible production, increased productivity, more efficient manufacturing processes, increased demand for skilled workers and increased investment. (Prasetyo & Sutopo, 2018).

Industry 4.0 is considered as a new industrial stage where the integration of vertical and horizontal manufacturing processes and product connectivity can help companies achieve better industrial performance (Dalenogare et al., 2018).

Researchers, as summarized by (Gautam, 2015) stated that entrepreneurship education focuses on entrepreneurial attitudes, skills, and managerial attributes. , while others relate to new business formation (18 percent), recognition of opportunities (9 percent) and, management of existing small companies (9 percent)(Gautam, 2015).

The pace of pedagogic adaptation is likely to continue. New forms of educational experience, new practices, new links to other disciplines, and improved computer simulations offer ongoing opportunities for educational innovation (Pittaway, 2021). The trend towards entrepreneurship education in the higher education is likely to continue, with more and more universities establishing entrepreneurship institutes and schools, as a separate discipline outside of business schools. In line with this trend, universities will continue to build more infrastructure dedicated to supporting entrepreneurship education, including dormitories, integrated facilities, creation rooms, and student incubators. (Pittaway et al., 2020).

University awareness in term of issuing policies regarding entrepreneurship education must also be an awareness for educators (lecturers) and entrepreneurship researchers. Entrepreneurship educators and researchers should strive to create a community of professionals that share the same values and goals, to fundamentally change the nature, practice and effects of entrepreneurship education by targeting, connecting and reflecting in the field. (Fayolle, 2018).

This study aims to determine the effect of industry 4.0 content on entrepreneurship courses – specifically on the development of student business ideas. Researchers put forward three research questions related to the content of industry 4.0 on entrepreneurship ideation learning content, respectively:

1. The lecturer's understanding of industry 4.0 content,
2. The adequacy of industry 4.0 contents in lecture content, and
3. The influence of industrial 4.0 contents on student business ideas in the entrepreneurship ideation class.

METHODS

Research Design

This is a qualitative research. Referring to the research objectives, this research was solely conducted to understand the information on the effect of adding industrial 4.0 elements to entrepreneurship courses on business ideas created by students. The phenomenon under study currently occurs within a certain period of time, so it cannot be manipulated. This research was conducted in 2021.

Based on this situation, the researcher has decided to use the Case Study method as the most appropriate approach to the research objectives.

Research Focus

The focus of this research is to understand how the influence of industry 4.0 content in entrepreneurship courses on business ideas created by students.

Research Object

This study aims to understand the influence of industrial 4.0 content in entrepreneurship courses on business ideas made by students in general, and how the industrial 4.0 content in entrepreneurship courses is understood by lecturers, and then delivered by lecturers in lectures.

Research Benefit

The results will provide an overview of the influence of industry 4.0 content in entrepreneurship courses on student business ideas carried out at a private university in Jakarta.

Research Informant

Respondents in this study were considered as informant respondents. This study has selected lecturers who have handled entrepreneurship ideation courses

as informants. The criteria for the selected informants are:

1. Have handled entrepreneurship ideation courses for a minimum of two semesters (where the industry 4.0 content is applied)
2. They have had mandatory training sessions for all entrepreneurship ideation classes

Data Collection Method

In-depth interview method was used to collect data. In general, an in-depth interview is a process to seek and obtain the required information by asking directly to the informant (face to face). Interviews were conducted from individuals (Bungin, 2007, 2013) to individuals to get clear information from informants.

In order to obtain more information needed, semi-structured interview method was chosen. This data collection method was chosen to be able to get open answers from the informants involved through interviews. This is in line with the statement of (Adams, 2015) which states that semi-structured interviews needs to be conducted if the researcher wants to ask probing, open-ended questions and wants to know the independent thinking of the informants involved.

Data Collection Procedure

Determining the Research Respondent

Research informants were determined by purposive sampling technique. This technique was chosen to get accurate results from relevant informants (with research subjects). Referring to (Bungin, 2007, 2013), one of the most common strategies for determining qualitative informants is the purposive method, in which informants are determined based on selected relevant criteria. Sample size was measured based on saturation theory. There will be no additional informants if there were no new information are collected, which means that there will be no new information that could add new perspectives in this research. (Bungin, 2007).

The informants involved are lecturers of entrepreneurship ideation courses. Based on these criteria, data were obtained from the 33 active lecturers and have handled entrepreneurship ideation courses for at least two consecutive semesters.

Research Implementation

In-depth interviews were conducted based on an agreement between the researcher and the informant. Interviews were conducted at different places and times. Each informant was given the same open-ended questions.

Metode Analisis Data

The data that were obtained from the in-depth interviews was analyzed immediately after the data collected were coded. The coding process is applied to all keywords. After the coding process is complete, and followed by with making abstractions. Abstraction is the process of making a summary of all the important facts, processes and statements from the informants. This process will be followed by the transformation of the data into units. Units will be categorized into groups, based on the topic of similar units. Researchers make summaries to simplify interpretation.

Research Limitation

The limitations of this research are:

1. The research was only conducted at one private university in Jakarta.
2. The research is only specific to the content of industry 4.0 in the entrepreneurship idea course.

RESULT and DISCUSSION

Result

The researcher has divided the discussion into three main topics, the lecturer's comprehension of industry 4.0 content, the adequacy of industry 4.0 content in lecture content, and the influence of industry 4.0 content on student business ideas in the entrepreneurship idea class, respectively

Lecturer's understanding of Industry 4.0

Based on the results of the interview, it was known that from a total of 33 lecturers who had handled the entrepreneurship ideation courses, 29 people stated that they understood industry 4.0. Two informants stated that they did not understand industry 4.0.

The results are quite interesting to see, related to the lecturer's comprehension of the content related to industry 4.0 in the teaching process of entrepreneurship ideation. A total of 24 lecturers stated that they were aware of the existence of the content (and using it in the classrooms), while 7 lecturers expressed their ignorance of the existence of Industry 4.0 content when they taught entrepreneurship idea.

Still related to industry 4.0 content, one of the 31 lecturers teaching

entrepreneurship ideation courses stated that they did not understand the purpose of the content of industry 4.0. Overall, almost all lecturers (30 people) stated that the industry 4.0 content understood how to use industry 4.0 content in helping students create business ideas.

Adequacy of industrial 4.0 materials in lecture content

The researcher also tried to determine the responds of te lecturers on the adequacy of industry 4.0 material in lecture content. Seven of the 31 lecturers stated that they did not feel they found materials related to industry 4.0 in the entrepreneurship ideation content.

The researcher then asked further about the influence of industry 4.0 materials on learning content in term of providing the students to comprehen the industry 4.0. Ten lecturers stated that the Industry 4.0 material was quite helpful, although five of them only felt less helped by the existence of the material, while 14 lecturers stated that they were not helped, and 7 lecturers stated that they did not feel that they had the impact of the material.

The existence of industry 4.0 material in the learning content was also stated to be less easily understood by 18 lecturers, while the remaining 13 stated that the material was easy to understand.

In addition, 17 lecturers felt that the industry 4.0 material in the entrepreneurship ideation content was not enough. Therefore, they took the initiative to add more industry 4.0 material to the content, while the other 14 lecturers continued to use the existing material.

The impact of industry 4.0 materials on student business ideas in the entrepreneurship ideation classes

A total of 28 lecturers agreed that the existence of the industrial 4.0 material provided support for the creation of student business ideas, and 4 lecturers stated that the industrial 4.0 material had no effect on the creation of student ideas. The 28 lecturers also agreed that industry 4.0 materials could be a differentiator for student business ideas, compared to prior the addition of industry 4.0 materials.

However, only 5 lecturers stated that the students' ideas that were formed were really related with the industry 4.0 material (80-100% of the total group in the class used business ideas related to industry 4.0). A total of 22 other lecturers stated that there were still many student business ideas that were not related to industry 4.0 material.

Discussion

Based on the research results, obtained answers related to the existing research questions. This study questions three things, namely: 1) lecturers' understanding of industry 4.0 materials; 2) the adequacy of industry 4.0 materials in lecture content; and 3) the influence of industry 4.0 materials on student business ideas in the entrepreneurship idea class.

Based on results obtained, it can be seen that not all entrepreneurship ideation lecturers have the comprehension on the industry 4.0 material in the learning content. This is certainly would have an impact on research question number 3, regarding the influence of industry 4.0 materials on business ideas that are formed. This condition, based on the results of research and triangulation, were caused by several factors:

1. Industry 4.0 materials that are included in the entrepreneurship ideation learning content has not provided in-depth information on industry 4.0 and its relevance to the development of student ideas.
2. Lecturers had given their interpretations of material 4.0 based on their perspective, and provide additional industry 4.0 material – which might lead to different achievement of the students – and furthermore, might not related to the learning objective that should be achieved.
3. The training provided to entrepreneurship ideation lecturers does not/has not touched the industrial 4.0 material deeply. Lecturers felt that they did not yet have the same and sufficient comprehension so they would be able to provide industry 4.0 material optimally.

In relation with the existence of the industrial 4.0 material itself, the lecturer stated that the material inside the learning content was far from sufficient. Several lecturers then decided to provide their own additions, based on their interpretation of industry 4.0 and based on their comprehension. This would trigger the differences in industry 4.0 material that were being shared into the entrepreneurship ideation classes.

The lack of comprehension of lecturers related to industry 4.0 material, as well as the amount of material that seems to be far from enough, turns out to have an effect on the formation of student business ideas, where only 5 lecturers stated that as many as 80-100% of student groups in their class succeeded in making business ideas based on industry 4.0.

However, this result is debatable, considering that not all the classes involved in this research are the classes that have students who were considerably quite familiar to industry 4.0 materials, that mostly are IT-based materials. Diverse classes (from various majors) are considered to have an influence on the formation of student business ideas.

CONCLUSION

The results of this study indicate that:

1. Lecturers' comprehension of industry 4.0 material still needs to be improved in order to have a stronger influence on student business ideas in the entrepreneurship idea class.
2. The industrial 4.0 material inside the entrepreneurship ideation learning content is far from enough or considered as unclear or incomplete. Lecturers feel they should add more materials, based on their respective interpretations and abilities
3. Due to No. 1 and 2, therefore it has an impact on student business ideas in the entrepreneurship ideation classes which still did not reflect the existence of industry 4.0 materials in learning content. Students still did not feel that they should connect their business ideas with with industry 4.0.

Reseach Limitations

This research has limitations.

1. The study was conducted only at one university, therefore the results may be very subjective and only applicable to this university.
2. This study has not considered the factor of major differences (IT-based or non-IT-based majors) that might have an impact on the formation of student business ideas.
3. However, the results of this study could be a starting point for other universities to examine the influence of industry 4.0 content on the learning content of entrepreneurship courses in the future.

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