A Design on Teaching and Learning Method for Creative Talent in the FOURTH INDUSTRIAL REVOLUTION

Kang Young-don
Dongyang University, Youngju, Republic of Korea

Abstract

Purpose: The purpose of this study is to examine the problems of the traditional teaching method, and to clarify how the teaching and learning methods for creative talents is reflected through the design on teaching and learning method for creative talent in the age of artificial intelligence (AI). The design of the creative teaching and learning model proposed in this study is largely classified into two stages, In-class (Offline Practice Learning Steps) and After-class (Post-Class Inquiry and Project-Based Learning). And the mechanism that connects learning states organically rather than independently separate concept, but is analyzed based on a questionnaire evaluation on the concentration and immersion of classes and the understanding of creative teaching and learning methods. And this paper explores that learners who will be at the center of future society have the power to think through concentration and immersion in solving their own difficult problems based on their experience of teaching and learning methods in university education. In this process, creativity is expressed. They will also feel happy with a sense of accomplishment, confidence, and satisfaction while solving difficult problems. This is why problem-based learning is necessary in university education. The teaching and learning method proposed in this study is to induce learners to think freely based on dialogue rather than discussion, and to lead the class by achieving the concentration and immersion in class, thus leading to a sense of achievement. The teaching-learning model, which incorporates elements that can solve problems on their own with convergent and logical thinking, has become an opportunity to reveal the importance of fostering creative talent for the artificial intelligence era.

[Keywords] Creative Talents, Artificial Intelligence, Teaching and Learning Method, Traditional Teaching Method, Imaginative Creativity

1. Introduction

Beyond the walls of the Third Industrial Revolution led by computer and Internet-based information society, the era of the Fourth Industrial Revolution, in which virtual and reality converged, and led by the AI society, has arrived. The beginning of the Fourth Industrial Revolution[1] is becoming a world in which not only competition with people who are striving for survival but also competition with machines with artificial intelligence. The development of science and technology, such as information and communication, has clearly progressed to provide a lot of convenience for humans, but on the other hand, it has also accelerated the problem of survival to survive the fierce competition such as the battlefield. Therefore, it is essential for companies that are preparing for the future to anticipate the need of fast-moving consumers and provide them with a competitive advantage by providing them with quality services. The
development of artificial intelligence, led by the Fourth Industrial Revolution, is leading the way to a new level beyond human expectations[2].

Artificial intelligence’s judgment and prediction capabilities begin with deep learning. Deep learning, one of artificial neural networks, makes it possible to make judgments and predictions using machine learning methods while repeatedly repeating the process of selectively extracting specific patterns using a large number of big data[3]. Moreover, the development of online to offline(O2O), where online technology connects to the offline market, is connecting consumers easily and rapidly spreading the predictive power of deep learning. More realistically, the age of artificial intelligence has been thought of as a result of computers and robots based on big data. In addition, hyper connectivity, where different disciplines are interconnected, is accelerating. For example, the connection of IoT, big data & smart farming is the future of agriculture[4], and also the connection between public transportation and IoT make smart cities. The next step in deep learning is the real revolution of artificial intelligence, which predicts and acts like human sensory functions. For example, three months after the Fourth Industrial Revolution, Google developed AlphaGo, which proved beyond human predictability and proved itself in a battle with humans[5]. In addition, it predicts the surrounding environment and analyzes traffic information closely to drive on its own and prevent accident driving. This is autonomous driving.

The society of reality is becoming another platform that is spreading in all industries, including service systems that are converged online and offline. The artificial intelligence Watson developed by IBM is being implemented in the off-line phase, which is used to predict disease or cancer[6]. It is clear that in the future society, there will be a clear difference between the companies that move AI and those who are aided by AI, and a society in which new judgments and predictions are centered. What talent will companies need in the age of Artificial Intelligence? It is a creative convergence talent.

Future companies are looking for talents who have learned about human empathy, such as identity and relationships, or those who have problem-solving skills[7][8] instead of smart talents with one expertise. These talents can come out through creative convergence education, which will be absolutely advantageous in the age of artificial intelligence. In other words, as future society is expected to be replaced by artificial intelligence, where machines replace people’s work, future talent with imaginative creativity that artificial intelligence cannot have is more important.

In general, universities which are higher education institutions, cultivate outstanding talents required by firms, and at the same time, companies that want to possess keen competitiveness are looking for creative talents to plan, develop, and service new products that enrich and facilitate human life. Therefore, it is inevitable for universities to change the paradigm of university education, that is, innovative change in education for future talent[9][10][11].

In the age of artificial intelligence, universities have very little will and effort to develop a variety of programs or contents on how to improve creativity or how to cultivate creative talents, even though future companies want creative talent. The role of cultivating creative convergent future talents should be centered on universities which are higher education institutions. In the age of Artificial Intelligence with a rapid development of computers and the Internet, is there a need for education that memorizes well and receives test scores according to the subjects given by textbooks in an environment full of knowledge and information?

Future university education should not be an injection or memorization education method like the traditional class, but a creative education[12][13] that can develop the ability that cannot be replaced by artificial intelligence or robot. In other words, not a uniform education that
requires the same ability, but creative education is required, that future talent can collect, explore, and analyze a lot of data to derive new information based on expertise, and to develop their own ability to think differently from others.

What about a people who are only 0.2% of the world's population, about 22% of all Nobel prizes, and 40% of the billionaires of the United States? Jews. And what are the driving forces that generate a lot of genius in world history? The reason is found in the unique Havruta teaching method[14]. A closer look at Havruta's teaching and learning method is very similar to creativity. This teaching-learning method is an educational method that constantly asks questions and answers to expand thinking and to consider others and to be different from others rather than to compete with others.

Creativity education with the characteristics of coming up with new things should stimulate curiosity about expertise and, through experience, discover new problems on their own and develop the capacity to solve them successfully[15]. Creativity education is the power to think in a word. At the core of creativity education is discussion and dialogue, as mentioned in the Havruta education. In this method of education, the other's opinion, logical thinking, and emotion are very important.

Although creative class can devise various methods, this paper proposes a design of teaching and learning method for developing creative talents in the age of Artificial Intelligence. The distinguishing feature of this study is to develop a sense of accomplishment by allowing learners to concentrate on fun and immersing themselves in a way that learners can freely set subjects and learn around conversations. Learners can maximize the concentration and immersion in the class, leading to a sense of accomplishment, thereby improving problem-solving, logical thinking, and imaginative creativity.

This study is meaningful that it can foster creative human resources who can actively cope with the rapidly developing uncertain society beyond the limitations of passive thinking talent education such as memorization education and the multiple-choice examination in the AI era society. In addition, It is meaningful that it can be organically linked to adjacent fields centering on basic research on the design of teaching methods.

2. Design of Education Model for Proposed Teaching and Learning Method

Communication between instructors and learners or learners is very important in the field of education. The ability to mutual communication with one another is to be able to speak appropriately so that the other person can understand their meaningful messages, to understand and use verbal and non-verbal expression forms, and to understand their writings, meaning the ability to write correctly to listen to other people’s opinions. Communication is important because it is built on cooperation, which is a very important ability for learners to prepare for the present and AI era.

For example, auto-driving car, many technologies are required, but the most important requirement is the auto-driving system and human communication. Therefore, learners should focus on developing communication skills in college education in order to understand and communicate with each other by sharing and collaborating information and technology in the AI era. Discussion is important in communication, but more important is conversation. In the age of artificial intelligence, conversations can rediscover the depth of others’ values by listening to and collaborating with each other, as opposed to the discussions that persuades them to compete with each other and to support the dichotomous arguments that divide their arguments be-tween right and wrong.
The educational model of teaching and learning method proposed in this study focuses on learning the creative thinking ability by listening to the other’s words while cooperating with each other by increasing the concentration and immersion of the class rather than the discussion.

Design of education model for proposed teaching and learning method is classified into two stages. In-class(Offline Practice Learning Steps) is shown in <Figure 1>, After-class(Post-Class Inquiry and Project-Based Learning) is shown in <Figure 2>, and The design process of the education model is shown in <Figure 3>, The contents of the education model are as follows.

① In-class(Offline Practice Learning Steps)

In-class classes are organized into theoretical learning and communication learning stages.

First of all, in the theoretical learning stage, the instructor provides video lecture materials to learners using learning tools such as YouTube, band, and smart apps. And Learners faithfully understand lesson while watching the video of the lecture, and write questions about the video content at the same time. At this time, the contents of the question are to list the difficult part of the class or one’s own thoughts.

Next when the video is finished watching, the instructor explains to the learners a summary of the video content and supplementation. At this point, the most important step is to answer questions written by the learners, and the instructor should try to minimize the learners’ questions by responding sincerely.

Instructors also tests how well they understand what they are learning. They may be several tools for testing, but this study used the play function of Kahoot[8]. Instructor should of course, prepare the contents for the comprehension tests in advance.

In the communication learning phase, as a problem-based phase, the learner expresses what he/she thinks about the learning contents in writing, i.e. summarize the learning contents and writes his thoughts in writing. This learning phase will develop into a self-directed learning phase. At this stage, learners can be taught individually or in small groups. In this study, the class was conducted as small groups.

Finally, individual learners or small groups carry out ‘group conversations’ so that other learners understand what they write. The significance of this ‘group conversation’ is that other learners can naturally feel the difference with their thoughts and sympathize with each other to expand the learning content, as well as improve logical thinking and mutual communication.

In the traditional teaching method, learners did not have the opportunity to collaborate and communicate with each other in the course of the instructor’s transfer of expertise, so there was no voice of learners in the classroom.

The most important thing to nurture creative convergence talent is to teach the class so that learners can lead with motivation and lead in the classroom. Therefore, the education model should be designed in such a way that learners can break the silence of the classroom with concentration and immersion in the class-room.
Post-class Inquiry and Project-Based Learning

In the After-class, classes are divided into inquiry learning and task-based learning stages. In the exploratory learning phase, learners summarize and organize their lessons, produce video themselves and upload them to YouTube. At this stage, you had a good understanding of the class, but you should make your own content after class and include your thoughts. The advantage of this step is that you can learn the videos your own make without time and space restrictions.

Moreover, the video production method and the YouTube production method can be extended to other subjects and do not need a separate textbook or note-taking. Therefore, you can develop their ability to express your own thoughts in words or in writing, by referring to other learners’ ideas. Thus, creative convergence can be increased.

In addition, it is necessary to use ‘conversation square’ of the band created by instructor to ‘communicate’ to understand the other’s opinions and to express their thoughts. The most important thing in the class is to express your thoughts actively based on the contents of the class rather than how much you understand it, and to improve your thinking ability by talking with other learners.

I think the Jewish Havruta teaching method is a conversational learning method rather than a discussion. The reason why ‘conversation’ teaching method is required beyond the discussion of ‘debate’, which was mainly dealt with in the age of the third industrial revolution, emphasized ‘out-
center' or 'cooperative learning' rather than individual-centered or competitive learning in the age of artificial intelligence.

And in the task activity learning phase, the instructor gives the learners a topic related to the class contents, they freely selects the subjects they are given, writes their intentions logically, produces video and registers it on YouTube. And as learners can examine differences with themselves, their strengths and weaknesses while watching what is registered on YouTube, it is possible to obtain not only thinking but also imaginative creativity.

Finally, the instructor should collect opinions from the learners about “what they liked in this class,” “what did they understand and what they thought about it,” “the advantages of this class,” and “what they hope for this class.” It is to use it as a reference for the next class.

The design of teaching and learning method for fostering creative talents proposed in this study is different from the Flipped Learning[16][17] and Project Based Learning (PBL). Flipped-learning is a teaching-learning method centered on online pre-learning and off-line presentations and discussions. And PBL is a teaching-learning method aimed at improving Logical thinking skill by improving problem-solving and collaboration on a problem-based project basis. These teaching and learning methods are innovative in that they complement the shortcomings of traditional teaching methods that convey simple expertise and encourage learners to participate in classes.

However, in the case of Flipped-learning teaching and learning methods, learners may feel burdened when the online lecture is difficult or the video volume is large. Furthermore, if the learner does not study in advance, the discussion class that is conducted offline can be difficult in itself. In addition, the PBL should be continuously connected from elementary school, even before entering university, but the linkage is extremely low considering the domestic environment in which the paper-based examination class is being conducted.

Moreover, instructors who need to perform various tasks besides classes, including various subject classes, are limited to continuous program or content development, and there is room for improvement in that it is not easy for instructors to prepare objective evaluation criteria.

However, the proposed teaching and learning method design has overcome the disadvantages of Flipped-learning and PBL teaching and learning methods. In other words, the proposed teaching-learning method design enhances the understanding of class contents in a short time by allowing the learner to watch videos made by the instructor in the class with the highest concentration of learners. Learners write their own summaries and comments, and then pre-sent them to other learners for easy understanding.

Moreover, this design in not a discussion state, which is the center of Flipped-learning and PBL teaching methods, but a conversation-based learning stage. It is characterized by the ability to broadly understand and think about each other’s opinions and various ideas. Therefore, it is possible to increase concentration and commitment to the class.

The future talent emphasizes the importance of creative convergence in the age of artificial intelligence. Then in which direction should universities that have creative convergence talents shift their education paradigm? It should be a noisy classroom rather than a quiet classroom like the Havruta learning method, an education that is thought in memorizing education, an education that emphasizes wisdom rather than knowledge transfer is central, and an education that explores various answers rather than one that teaches one correct answer.

In the future, we need to continuously integrate our knowledge and information, improve our ability to come up with new ideas, communicate with others, and continue to create our own ideas to improve our creative skills. Therefore, universities that nurture future talents should express their ideas in writing and develop into a teaching-learning method that focuses on dialogue rather than discussion.
3. Conclusion

This study proposed the design of teaching and learning methods for developing creative human resources in the age of the Artificial Intelligence. As future society demands more creative convergence talents, education that delivers simple expertise should be transformed into dialogue-based education. And it should be shifted from teacher-centered education to learner-centered education. In addition, it should be shifted from a competitive learning system to a collaborative learning system.

In the age of artificial intelligence, the ultimate goal of education in universities should be to nurture talent so that those who will lead the future can dream of happiness. For anyone, problems appear and try to be solved in some way or another way. How do you deal with a difficult problem if it is given?

An inexperienced person will likely give up before solving a difficult problem, but an experienced person will develop confidence and challenge. Every time a problem arises, it tries to solve the problem by applying standards and judgments in its own way, which can lead to happiness when solving the fundamental problem with convergence and creative thinking. This is why creative education is so important.

The proposed teaching-learning model was applied only to the 'Intensive English Reading Class', but it is expected to expand the scope of the basic research proposed in this paper to be organically linked to other adjacent fields. In addition, based on the experimental teaching-learning model for this study, it is expected that the preceding research can be conducted in accordance with the domestic educational environment by attempting a technical approach such as developing various programs or contents.

4. References

4.1. Journal articles

4.2. Books


4.3. Conference proceedings


4.4. Additional references


5. Contribution

5.1. Authors contribution

<table>
<thead>
<tr>
<th>Initial name</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>KYD</td>
</tr>
<tr>
<td></td>
<td>- Set of concepts ☑</td>
</tr>
<tr>
<td></td>
<td>- Design ☑</td>
</tr>
<tr>
<td></td>
<td>- Getting results ☑</td>
</tr>
<tr>
<td></td>
<td>- Analysis ☑</td>
</tr>
<tr>
<td></td>
<td>- Make a significant contribution to collection ☑</td>
</tr>
<tr>
<td></td>
<td>- Final approval of the paper ☑</td>
</tr>
<tr>
<td></td>
<td>- Corresponding ☑</td>
</tr>
<tr>
<td></td>
<td>- Play a decisive role in modification ☑</td>
</tr>
<tr>
<td></td>
<td>- Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑</td>
</tr>
<tr>
<td></td>
<td>- Participants in Drafting and Revising Papers ☑</td>
</tr>
<tr>
<td></td>
<td>- Someone who can explain all aspects of the paper ☑</td>
</tr>
</tbody>
</table>

5.2. Authors profile

Author

Kang Young-don / Dongyang University Professor
B.A. Chungnam National University
M.A. Chungnam National University
Ph.D. Chungnam National University

Research field
- A Study on Teaching and Learning Method of Expanding PBL Based on Flipped Learning, The Journal of Humanities and Social Science, (10)2 (2019).
- The Androgynous Contraposition and the Absence of Communication in to Room 19 & a Room of One’s Own, The Journal of Humanities and Social Science, 10(4) (2019).

Major career
- 2005~present. The Association of Modern English Studies, Board Member
- 2011~present. Dongyang University, Professor
- 2015~present. The Journal of Humanities and Social Science, Editor in Chief
- 2016~present. Science Future Convergence Education, Board Member
- 2019~present. International Society for Robotics & AI Ethics, Vice President & Editor in Chief

5.3. Funding agency

This work was supported by Dongyang University Research Grant in 2018.