

## A Study on the Culture and Technology Convergence Linking Education Process through the CL (Collaborative Lecture) Teaching Method

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### ABSTRACT

The cultural technology major is a convergence of various studies and knowledge, with the goal of convergence between various disciplines such as culture and arts subjects in universities, humanities, science technology, and management/marketing. Furthermore, we can see this case of convergence as a curriculum development to study the educational model of a holistic university education that fosters creative thinking through the convergence of various majors rather than a curriculum that creates experts with only one major in the form of an educational model that is connected to the meeting of technology and humanities emerging after the fourth industrial revolution. This is traditional interdisciplinary exchanges within the university, as well as a response to pure academics preparing for the “complexity” of the future society centered on the convergence of majors, a study to find out how basic and pure studies can be applied to various industrial changes that can appear in the future society through the convergence of culture and art, humanities and technology to enhance human imagination, and an interdisciplinary convergence that can inform the students, who are the beneficiaries of education, of the experiences of various disciplines. Therefore, the Cultural Technology Convergence Major, created at Konyang University, aims to develop a creative curriculum design and majors that can help learners by converging humanities courses, science technology, design, and marketing courses opened within the university based on the concept mentioned earlier. Accordingly, this researcher conducted preliminary research on convergent majors in order to minimize collision between sciences that can occur in the process of integrating such sciences as the humanities, science technology, culture and arts, and design and marketing, develop convergent majors reasonably, and build up a system for it. To address the goal, the FGI was carried out with experts on the curricula of convergent majors blended with cultural technology and students, the consumers of those majors, to collect their opinions and examine their attitudes. In addition, to verify it, grounded on the results of several surveys, this study investigated the most crucial factors in the process of forming new convergent sciences or majors and designed convergent majors reviewing studies conducted by professors of culture and arts, the humanities, science technology, and management/marketing.

## 1. Introduction

Currently, many universities are developing convergence majors and linked majors through digital transformation in their curricula to help students find employment by developing the ability to use computing and select various majors of learners in line with industrial changes in the future society. In particular, the need for major development through the convergence of major curricula is to reduce the burden on students to complete credits and to spread DT (digital transformation) among students in the humanities and social sciences within the university to broaden the perspective of finding jobs and entrepreneurship, but it is also a trend to prepare students according to the critical perspective of the future industry and changes in industry trends (Ministry of Science and Technology, 2010). And today, there are ongoing convergence of various disciplines and the reorganization of the school system to enhance the creativity of learners through the development of majors suitable for industries and convergence between majors to nurture talents suitable for new industries, and the effect of fostering practical problem-solving skills and creative convergence-type talents in finding employment after graduation and entrepreneurship. This boom in curriculum development started with various experiments have been initiated by several universities several years ago, and the Korea Foundation for the Creativity of Science (KFST) centered on the STEAM curriculum was also researched and developed in this context, and based on these efforts, many universities developed a creative convergence process through the convergence and integration of liberal arts and sciences.

In this study, I researched the CL (collaborative lecture) research, which is the teaching method of the creative convergence type class module mentioned above, and based on the study, I researched whether it is possible to design a learner-centered class by establishing a cultural technology convergence curriculum and the cultural technology convergence major based on the results of the two-year off-season program for the design of the convergence major. Professors from various departments participated in this convergence major course to promote exchange and convergence research between various disciplines beyond one department unit, and based on this, we plan to open and operate the convergence major curriculum at Konyang University in the first semester of 2023. This is a wide curriculum that goes beyond simple convergence of majors and is combined with liberal arts subjects, and the final goal is to establish a new department through a convergence major that develops into a major through liberal arts subjects in the future. And the convergence process of the curriculum is the core of the design of this course, and I intend to develop this research method based on the following three points.

First, it aims to converge studies like Oxford's PPE, starting with linking majors in the humanities and social sciences that can be converged and combined with some subjects, and the second core of course development is the development of major modules that appear in the convergence major course and how to select courses from other majors that can be linked to the convergence course. Thirdly, it will be a good curriculum for convergence majors if we provide instructors with satisfaction surveys on the convergence major subjects and information sharing of class contents for education quality management after the classes of convergence-related major courses are conducted.

In order to design a successful interdisciplinary major, we can discuss the lecture method and education method in the following two ways, and the researcher has summarized this method based

on the successful cases of the convergence majors at Cheongju University and Konyang University in which the researcher participated.

The first convergence major itself is not a way to deal with the lecture center of a specific department. When designing a convergence major, many universities operate a convergence major by bringing a subject that appears to be popular among subjects in a specific department and asking them to take multiple departments. However, no matter how popular a subject in the major of a particular department becomes, it is not a subject that is linked to other majors as a major of the department, and therefore it can only be seen as an interpretation of educator convenience, not learner-centered. And even if these convergence majors were offered, not only would they fail to obtain good results in evaluating the effects and lectures after taking courses, but they would remain as failed examples of convergence majors at the same time they were opened.

Second, we can say that the center of the settlement of the subject is how the “team-based lecture class” method, which is mainly used in convergence major classes, is applied. If there are more than two departments participating, the professor of the department should be able to plan and proceed with the lecture from a neutral point of view, excluding the biased viewpoint of his or her department. In the case of “team-based lecture classes”, the advantage is that major professors from various departments deal with the convergence between majors in-depth and deliver creative learning content to learners. In addition, the biggest attraction is that it can deliver various academic viewpoints and perspectives to learners simultaneously as educational effects. However, another disadvantage of the “team-based lecture class” is that a major problem may arise in a conflict between disciplines and the purpose of the convergence major when simply conducting one lecture in a given area of one major. So, to supplement this problem, continuous discussions, encounters, and discussions between instructors with different majors are needed, and we can say applying this in classes is most important.

In the current university curriculum, convergence major means integrating knowledge from other disciplines and various majors into one, structuring it, and developing it into a creative discipline. Therefore, the important goal and objective of the university education method through creative convergence majors proposed in this study are to nurture talents to allow learners to acquire knowledge and methods in various interdisciplinary areas through collaboration between majors and to apply them to the real world by expressing creative thinking. The culture and technology major can be defined as a collaboration between disciplines or majors in the sense of combining two or more majors and studies, and therefore, in this thesis, this educational method is named “collaborative lecture” to begin the above research for developing and utilizing convergence majors through new teaching methods.

## **2. Culture and Technology Convergence Major and CL (collaborative lecture) Classes**

### *2.1 Definition of a collaborative lecture (CL) class*

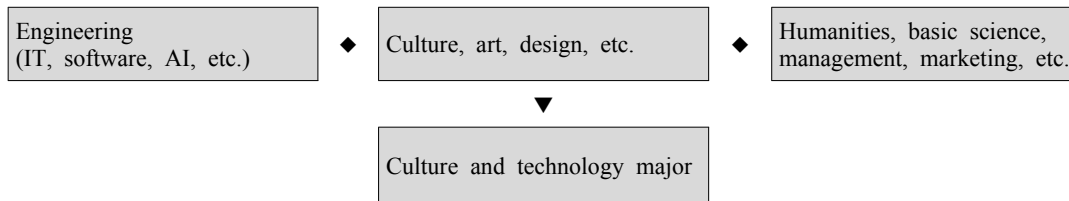
The CL (collaborative lecture) class may not be a new subject or teaching method. It refers

to the convergence between majors of existing departments and other disciplines and majors, as well as the curriculum of exchange and collaboration. For example, it is a curriculum that develops two or more subjects, allowing collaboration between majors in three or more departments and majors, converging them into one major, and connecting them. To clarify this definition, it goes beyond a simple learning process to include a convergence degree between various majors and a processor configured to allow learners to design their majors. It is not a specific major-oriented course or process provided unilaterally in the existing collaborative process but a process in which learners design and acquire their major degree by self-directed convergence between majors in the curriculum and degree course, and we can also define it as a modular curriculum designed with a focus on collaboration between majors required for learners to advance to higher education, find employment, and start a business.

To put the culture and technology convergence major as a simple analogy, it can be compared to Google providing Android's Play Store service when using a Samsung smartphone. The Play Store service is a virtual space where a third-party content provider other than Google and a user, a consumer, can directly meet, and in some cases, a consumer can simultaneously be a user and create and activate content. Like this culture and technology convergence major consists of a single app in each department within the designed convergence major and constitutes the contents of a smartphone, which is an object, the composition of the smartphone app again provides users with an environment for sharing content, and makes the shared content (subject) a minimum requirement, and we can say the collaborative class between majors that shares it is the CL (collaborative lecture) class in this study.

First of all, the CL (collaborative lecture) class referred to in this section can also be referred to as a course in which two or more courses are combined in each major or track. However, for a more precise definition, I think it is necessary to organize the competencies of universities and the core competencies of majors in order to clarify the categories of majors that collaborate in this thesis and the learning process to be performed, so I summarize them in the next chapter. Therefore, I planned and designed subjects that could be collaborated among the subjects of departments that could be converged as lectures, excluded subjects that did not seem to be related to collaboration, and selected basic subjects from three majors and designed them as the basis for the major. Second, I designed class research as a basis for resolving the dissonance between majors or disciplines as engineering, art, humanities, and basic science subjects are converged in the lecture process, which is the execution stage of the teaching method. The reason why I conducted class research first is to set up the differences between disciplines that may appear in the learning process from various viewpoints, consultations, and cooperation and to preemptively respond to the problem that needs to be solved in the process or to be corrected and supplemented within the learning result. Finally, the culture and technology convergence major is shown in the figure below: I have searched for misunderstandings or problems in the convergence major through non-scheduled classes to reflect student opinions as a convergence major created through exchanges and collaborations between various disciplines and conducted various surveys to reflect the learner's needs in the class.

**Table 1.** A schematic diagram of a major linked to cultural technology convergence through collaborative selection



As shown in the figure above, the Culture and Technology Convergence Major is a curriculum that combines two or more majors and liberal arts college courses, and breaking away from the teaching methods handled by the existing departments, I designed subjects that fit well with the learner's major, subjects that can help in their career, and majors that allow learners to choose their major, and in addition, the CL (collaborative lecture) class, which is a teaching method, emphasizes the meaning of progress as a class that emphasizes communication between learners and professors in different majors, similar to the learner-centered undergraduate research (UR).

## *2.2 Application of the CL (collaborative lecture) teaching method in culture and technology convergence major*

The CL (collaborative lecture) teaching method is a modular curriculum that allows students, who are education consumers, to complete convergence majors, and modules were developed and opened based on newly created subjects by finding commonalities between disciplines, not existing subjects so that learners of their major and other majors can access each other. This is designed to reduce the concentration of majors or tracks in specific departments and to avoid discrimination and restructuring of participating departments, humanities, and basic liberal arts subjects so that the module stages are designed in stages ranging from basic, advanced, and advanced majors, and because of the design of this teaching method, the CL teaching method has the following advantages in the culture and technology curriculum.

First, this is designed as a teaching method suitable for convergence majors with a structure that allows collaboration between majors of departments existing in universities and other studies, and is different from teaching methods that forcefully open new courses or restructuring type classes. For example, in developing a subject called Humanities and Design by linking the design major subject of computer graphics with the humanities, and in conducting classes, the design department professors do not conduct classes alone, but the humanities major professors and design department professors collaborate, and the major for each week for each professor was also designed in a modular way. This is a big difference from the convergence curriculum currently operated by many universities, and it is not a module made by a professor who majored in a department, but the teaching process of one department and the teaching process of another major are carried out together with a demand survey at the beginning of the semester so that students can take classes by week like Lego blocks. Many convergence majors are giving difficulties to the development of convergence

majors by providing software-centered subjects and teaching methods that they want to change into subjects favorable to employment and entrepreneurship, contrary to their purpose. However, the cultural technology-linked major presented in this thesis was designed as a characteristic of the convergence curriculum by finding an intersection that can be exchanged between the humanities and social sciences, philosophy and management, and marketing and software majors rather than software. This was possible because of the exchange and discussion of teaching and learning methods of various majors in the design of education development and convergence-linked curriculum, and also, with the development of subjects focusing on communication and exchange between disciplines, the actual operation of lectures was not overburdened through the subjects and teaching methods developed in the design of the convergence major.

Second, the culture and technology convergence major strengthened the collaboration process in the teaching method so that learners can design their own major and receive a degree to design various majors with various major names. This CL (collaborative lecture) teaching method means that learners connect various majors, and if the requirements for credit completion and academic schedule are satisfied, it should be accompanied by a flexible semester system in which majors can be completed at the same time as the currently implemented major track in the university. An essential requirement for the Culture and Technology Convergence Major is a teaching method that can be linked to various majors such as IT, culture and arts, humanities, and philosophy and a teaching method in which collaboration with professors is important, and it is necessary to establish a self-directed learning plan for learners to review and revise during the degree process, and to have constant discussions between instructors and learners.

Third, it is not an exaggeration to say that the convergence major in today's universities was born to connect with social needs, especially employment, and entrepreneurship. This is because the convergence major must contain the jobs of the future industry, called the 4th industry, the shape of its system, creative convergence social demands, and the agenda of software utilization, and also, in the sociological approach, it is because the goal is to train specializing generalists who can solve various problems with various perspectives and methods in response to the change of the times and the presentation of directions. The current administration aims to nurture talented people who can respond to various industrial fields. Convergence between majors is the development of majors specialized in major technologies and strategies presented by future society, and collaboration between disciplines can be regarded as very important, and in order to adapt to and cope with the changing paradigm and occupational group of modern society, classes should have openness so that students can derive ideas that can derive results by substituting their own capabilities into specific situations. Therefore, we can say that the CL (collaborative lecture) teaching method is optimized as a teaching method for convergence majors for this purpose, and at this time, a lecture pairing method that connects multiple lectures may appear.

Fourth, the culture and technology convergence major is a subject that integrates major subjects based on basic studies that can be easily linked to liberal arts subjects, which are humanities literacy courses, IT, software, and management and marketing majors, and the teaching method should also be widely operated.

The CL (collaborative lecture) teaching method is an educational method tailored to the character-

ization of these convergence majors, and it recommends a hybrid teaching method that can concurrently proceed with the liberal arts curriculum called humanities literacy course in the basic major course. This module course can lead to collaboration between majors and liberal arts subjects, liberal arts subjects and liberal arts subjects, and blended and hybrid teaching methods should emerge.

Finally, today's curriculum for convergence of liberal arts and major education is a social demand, a trend in the academic field of the future society, and a teaching method that aims at maximum self-directed problem-solving in the future, such as the learner's creative convergence ability, competency, knowledge, and skill acquisition, and the convergence of general ability and humanities knowledge in the major area will be able to achieve synergistic support for teaching methods.

### *2.3 Learning competency design for culture and technology convergence major suitable for the CL (collaborative lecture) teaching method*

In order to complete the culture and technology convergence major through the CL (collaborative lecture) teaching method, it will be necessary to analyze the various needs of learners and the industrial structure, but the design of the learning goals and core competencies that design the career of students who can be considered as consumers of convergence major courses must be well presented. In particular, in degree courses or linked education courses that can be linked to employment and entrepreneurship, the composition of core competencies and the management plan of the curriculum should be well designed to fit the times. Therefore, if the part about flexible academics for the academic system for the CL (collaborative lecture) teaching method was described in the previous chapter, in the culture and technology convergence major, the core competencies of universities that can organize and operate convergence majors are configured together, as shown in Table 2 below.

Even in the approach, the learning competency design of these convergence majors should be operated as a basic unit curriculum according to the semester that students cycle in college, and the progress of classes in the educational method will require a more systematic composition for the development of external environmental parts and practical capabilities centering on the increasingly advanced process, so the competency process and detailed process put great significance in constructing a learning competency process that connects the competency definition to collaborative education and learning between majors.

**Table 2.** Design of university's core competencies in culture and technology courses

Category	Competency	Sub (detailed) competencies	Definition of sub (detailed) competencies
University's core competency	Self-management competency	Ability to plan	Specific plans for completing learning goals and a tendency to live according to plans
		Time management	The ability to allocate time appropriately to achieve what the student wants
	Resource utilization competency	Ability to use information	Student's ability to utilize and apply the information collected

Category	Competency	Sub (detailed) competencies	Definition of sub (detailed) competencies
	Leadership competency	Ability to collect resources and information technology	The ability to collect time, budget, human and material resources in detail, as well as textual, numeric, pictorial information, information and communication, science and technology, equipment operation skills, etc.
		Responsibility	An attitude of taking seriously the duties or obligations to be undertaken and actively carrying them out
	Creative problem-solving competency	Flexibility	The ability to change one's thinking or behavior by collecting the opinions of members
		Problem recognition	The ability to think that there is a problem and to discover what the problem is
	Global competency	Flexible thinking	Ability to think out of the box and present various solutions
		Exposure to the global environment	Attitude to actively participate in experiences such as language training, overseas travel, overseas volunteer work, friendship with foreigners, and participation in language programs
	Communication and empathy competency	Global language skills	Language communication skills such as English or Chinese for communication and harmony with people around the world
		Subject understanding ability	Ability to understand the core content of a topic
		Mutual understanding ability	Attitude to understand and accept others

And as described above, the subjects related to employment and entrepreneurship in the convergence major course, which is expanded from detailed courses, show in Table 3 how they can help in employment and entrepreneurship using lectures offered in the department of operation or lectures opened for the majors of the college based on the core competencies of the university, in other words, how the demand requirements and conditions of industries can be achieved through specialization of majors.

**Table 3.** Specialization capacity of cultural technology convergence major

Major specialized competency	Creative competency	Problem solving ability	Ability to present creative content based on the basic principles and applications of 4th industrial revolution technology and related industries
		Planning ability	Ability to take a creative approach to content planning methodology based on analyzed theoretical knowledge and experience
	Convergence competency	Collaboration ability	Routine, everyday ability to collaborate with the community and actively respond to tasks
		Project execution ability	Ability to utilize engineering and art convergence technologies and related platforms
	Practical work development competency	Programming ability	Ability to create desired digital content in a working environment
		Ability to use development tools	Ability to plan/produce/distribute content through realistic content production practices based on development tools



Finally, when the culture and technology convergence major was designed through the CL (collaborative lecture) class method, I divided the roadmap into the basic courses, advanced major, and convergence capstone, as shown in Table 4 below, to see if learners take each step of the process and whether the major could be designed in a modular way. This eased the burden on the learners and, at the same time, placed basic studies, basic software, and basic majors in liberal arts subjects in the first tier, the 2nd year basic track.

**Table 4.** Roadmap of cultural technology convergence major

Category	Sophomore	Junior		Senior	
		1 <sup>st</sup> semester	2 <sup>nd</sup> semester	1 <sup>st</sup> semester	2 <sup>nd</sup> semester
IT, SW	Software basics	Software professional	Software intensive	Convergence project	Convergence capstone design
Humanities/Science	Humanities	Culture and art	Digital content	-	-
Introduction to convergence major	Basic science	Business administration	Marketing	-	-

In the second stratum, the track consilience course and deepening of the interdisciplinary major, the balance from the basic to the advanced course of the convergence major was configured, centering on the learner. As most of the new subjects, the layout of the basic courses of the department that is less burdensome to the convergence major appears, and the module of the subject as an integrated process begins, and the operation of a full-fledged CL (collaborative lecture) teaching method must be presented with subjects that can be negotiable between majors. And this design is the process of creating a major as modules are piled up, and it is designed as a bridgehead for the convergence major degree course where the name of the convergence major is created through connection with other majors.

The third layer, the advanced major course, is the final course of the convergence degree. It is a capstone design and project class centered on linking majors and lectures and requires analysis, research, review, and approval by professors of each major. This is of great significance in that learners create their major through self-directed learning, and we can say that the major was organized so that a creative convergence major can be created by designing the convergence major to suit the student's capabilities, focusing on the specialization of the major.

### **3. Conclusion: To Learners in the Subject of Cultural and Technological Convergence Majors**

Currently, many universities are developing and implementing various convergence majors to respond to future industries and encourage students to start their own businesses. Therefore, it must be developed carefully or while minimizing friction between departments. When designing convergence majors, the matters to be considered until the end are considering the characteristics of the participating

departments and whether they communicate so that collaboration between departments can be achieved well in designing and managing majors. And finally, how many different discussions and consultations are made in performance management can be regarded as the final design of the convergence-linked major.

Even in Korea, many universities have created interdisciplinary majors that combine “culture and technology”, but only KAIST and Sogang University’s interdisciplinary majors are a few successful examples. The reason for this result is that we created this course as a formal convergence major design for the Ministry of Education project rather than a university design focusing on the university’s educational philosophy and learner demand basis, or convergence of “culture and technology” as a medium for integration between departments.

Successful design in convergence major design is how well the university’s ideal talent, educational goals, objectives, and capabilities were reflected when constructing an education system through the linkage between departments and disciplines, and even in the composition of convergence majors, it is important to design as a competency development subject based on how much creativity-based competency, collaboration competency, problem-solving competency, and global competency the student has.

The “Culture and Technology Convergence Major”, which I am designing through previous research, completed the curriculum process by designing CL (collaborative lecture) teaching method and presenting a roadmap for creative derivation. Also, I will operate a convergence major from the second semester of 2023. In addition, for the successful convergence major, I will continue to research the specific needs of learners and analyze the learning environment, and secure the continuity of the convergence major through class research meetings with professors from participating departments. Accordingly, I will secure the driving force to develop into a student-centered linked major as much as possible by applying modifications and reorganizations according to the results of operation every semester.

Finally, since the actual operation of the convergence major through the CL (collaborative lecture) teaching method is operated according to the voluntary course registration and learning results of learners (participating department students), constant communication and efforts between professors and learners are required from course registration to progress.

Finally, the subject of the convergence major, will conduct continuous research to improve the quality and quantitative reinforcement of convergence subjects and prepare various learning platforms and archiving so that qualitatively excellent convergence subjects can be opened. Culture and technology majors should serve as a foundation for students, who are the subjects of learning, to build knowledge and capabilities in each major and degree course through collaboration between various disciplines, and various titles of majors will appear. Therefore, when courses are taken, more courses should be developed, and research on new teaching methods should be steadily conducted so that a diversity of convergence activities using specific majors can be secured.

## Conflicts of Interest

The authors declare no conflict of interest.

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