A Study of Modern Pedagogical Effect of Science and Design College's Student in Taiwan

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***Abstract*—Over the past few years, the automation changed our daily life. A lot of current jobs are disappearing, and people in favor of working on problem solving or innovating. The schools today try hard to educate their student in those creative and social skills so that students are adequately equipped to meet these challenges.**

To catch up the world, The Taiwan ministry of education carries out a project named Innovated in teaching in recently years. These new pop-up technologies do really affect our teaching way in classroom and communication with our student. But in some specialist and our culture background, is this necessary for us? In this study, we discuss a case in department of design in college, which carry out the different teaching method in their class. The aim of the study would also be to find how the new teaching method influence students' learning and how other evidence reflect the real feeling from students. The study would also compare how different the students answer the questionnaire between paper and online. The study would further aim to discuss on how student feedback when teacher put the new skills into the class. Finally, we contemplates on why high satisfy on class but low performance in students' grade. The study in general will paint the significance of new pedagogical as a teaching method that may not work in some specialist and our culture background. It is believed that these methods help to improve teachers' skills, but maybe not learners.

***Index Terms*—Pedagogical, modern teaching, case study.**

I. Introduction

This century is called the age of Artificial Intelligence and Robotics. The Internet is connecting whole the people in the world as never before. These transformations are changing the demand for skill. As artificial intelligence becomes more powerful, a lot of current jobs are mean to disappear. When new fields of economic activity arose, the evolution of technology is impact us in every day. The low-skilled jobs are at high risk of becoming computerized in the near future [1]. Working in the 21st century requires the ability of creativity, critical thinking, communication and collaboration. To prepare our students for the new age, we try to train them have more ability like digital literacy, proactivity, adaptability and open-mindedness more than ever before [2]. These educational approaches propose a more constructivist view to teaching and learning. It shifts the teacher from the absolute knowledge offered to the student's active participation in knowledge [3]. Students are asked to show their talents and pushed to learn in new ways. Do the teachers succeed in modern changes?

Education has evolved in leaps and bounds in recent years. A number of different teaching techniques have arisen due to this change in education. To cope up with this new worldwide trend, our ministry of education carries out a project named Innovated in Teaching in Taiwan from bottom-up to top-down. It tend to rise up the teacher's professional development and the student who to awaken their curiosity and desire to learn. Modern Teaching is all the rage. Seems the more teaching techniques we use in class, the better teacher we become. Truly the new occupations and new tech-industries maybe did not exist ten years ago, and some occupations vanish in recent ten years. These new pop-up technologies do really affect our teaching way in classroom and communication with our student.

In an effort to better understand how pedagogical effect student to this end, presented here is a review of a case study on the design department college student in Taiwan. Which the department just comply the project in Improve Teaching.

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II. Background

Traditional education stills the dominant approach to education. The role of the educator is to transmit this knowledge, along with accompanying academic skills and attitudes. Some educators believe that the main purpose of education is helping students develop an inquisitive consciousness of the conditions. For some educators, the ideal education is centers on a student's entirely self-motivated exploration of whatever the world offer [2].

Since the 1980s, experts have identified different teaching methods to improve our education [4]. Traditional pedagogical techniques based on teachers explaining. This is meant that every approach that a teacher uses to convey their content to students would be considered as a teaching method. Teaching methods' could have the different theories of teaching and learning, of course contain the basis methods and principles [5]. In order to rise up students' motivation to learn, teachers have to use creative content that are challenging for students [6]. But education today revolves more around student-centered learning [7]. For teachers, the traditional teaching method is the simplest and most effective method, but it cannot raise students' interest in learning. The modern pedagogical made the classroom as an open space where the teacher provides student opportunities to discover, using a task based approach, find out the answer by themself and that is relevant to the real world. Educationalists use different methods, emphasize every pedagogical is uniqueness and necessary, the similarities of the approaches are more impressive than their differences [8]. Teaching method usually organized into four categories based on two major parameters: a teacher-centered approach against a student-centered approach; a high-tech material use against

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low-tech material use. Teaching methods or pedagogical is a narrower topic because it's founded in lots theories and educational psychology. These educationalists propose many pedagogical, it just turn the teacher-centered approach into student-centered. Many of these teaching techniques are not actually new now. The use of technology in the classroom has given education a new face which allowing us to approach old ideas in new ways. How teachers teach and students learn has a strong influence on student outcomes [9]. Therefore, teachers aspire to educate, to inspire, to learn and to affect positive change.

In recent years, to improve university teachers' teaching skills and pedagogical thinking is now necessary in world. Many countries have made decisions in compulsory pedagogical training of university teachers [10], [11]. This is to make sure teachers are aware the modern methods and new technology in teaching so as to improve the quality of education.

In Taiwan, the government takes it as necessary to prepare teachers for the age of Modern Teaching Pedagogical and the Technology. This program aims to improve the teaching quality for teachers. Teaching process of adopting proper research method and tools to verify its effectiveness for the purpose of elevating teaching quality and promote students' learning effectiveness, which is achieved through the utilization of curriculum design, teaching methods, or introducing education instruments and the use of technology. To connect college teachers' individual research and students' learning cultivation, government will review the program proposed by teachers in the colleges regarding the research program and course planning, and whether the direction for student cultivation is in line with the direction of the development of colleges' affairs.

The policy pushing teachers jump on the bandwagon; carve up the subsidization from nation. Through some skills and capabilities of using different technologies are necessary for students as well as teachers. Such tools will help student's imagination thrive and grow. But in some specialist and our culture background, is this necessary for us? Or maybe we have to develop our own pedagogical to suite our student? We will discuss at the end, and have a brief case in next section.

III. Method

This is a government project which carries out between 2018 September to 2019 February. The entire questionnaire used is providing from the professional. And all the teaching method is limited in some pedagogical which will describe in the next.

A. Project Framework

For support education, teachers are encouraged to put forward teaching ideals, apply new ideas, teaching aids, or innovative methods in actions. This government project is similar to the research project application of the Ministry of Science and Technology. Even many measures are carried out with reference to the direction of the science research project model. It is familiar to university teachers, but how to distinguish from academic research from teaching classroom is highly attention. In order to put teaching back to track, this is a means to solve the problem of higher education deviating from the teaching to academic research.

In fact, there are many students waiting to learn in the universities. University teachers should keep a balance between teaching and research, both in response of expectations from society. In 2018, there were 2,174 project applications, and 1,034 were approved. There are Fifty-two percent for university and forty-eight percent for college (see Table I).

TABLE I: The Main Method Using in Project

Method	Core principles
Flipped Classroom	The Flipped Classroom Model basically involves encouraging students to prepare for the lesson before class.
Massive Open Online Course	A Massive Open Online Course is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance.
Case Method	The Case Method is a participatory, discussion based way in learning; students learn skills of critical thinking, communication, and group dynamics.
Role Playing Method	Role Playing Method is assumes student to participating a character in a designed scenario, to enhance understanding of a topic, and surrounding issues, and human interaction.
Problem-Based Learning	Problem-Based Learning is a student-centered pedagogy. Students learn problem solving in the process, and how to think about the problem and to find possible solutions.
Cooperative Learning Method	Cooperative Learning is let students work together in small groups on a structured task. Everyone shares a mutual goal, and individuals are given separate sections or tasks to complete which are then compiled and edited to ensure consistency throughout the work.
Mastery Learning	Mastery Learning is a cycle continues until the learner accomplishes a level of mastery, and they may then move on to the next stage.
Action Learning	Action Learning is a process that involves a small group working on real problems, taking action, and learning as individuals and team. It involves taking action and reflecting upon the results.
Open Course Ware	An Open Course Ware is a free and open digital publication of high quality college and university-level educational materials. it is free and openly licensed, accessible to anyone, anytime via the internet.
Others	Any other methods to engage students in learning.

(Resource from: Stanford University. Stanford Teaching Commons: Teaching Resources.)

As table one, these picked learning methods that contain most of the principles that improve learning. It formed to students' learning preferences and promoting student empowerment and accountability. It aims to help students develop higher order thinking skills and a substantial knowledge. It encourages student's active learning and self-directed learning to solving problem, making decision, and thinking critically.

Teachers chose any method as table one, combine or chose one to put it in act in their class room. Although distinct, these teaching methods can sometimes overlap. In principle, the designated practices are compatible with any of the other teaching methods, included the traditional lecturing. To make sure the teacher is in the right action, there is a review for

every teacher's apply. One college may have lots teacher run this project in their class of different department. This project intends to make the new teaching methodologies to changing the educational environments, and driving better academic performance among students.

B. Sample

During the execution of the project, the department of design opened eighty-six courses which taught by twenty-nine teacher. And all teachers are asking for carry out one course by using those methods.

In this study, the second-year students of a college, Department of Design is used as subjects. The study was carried out with n=143 students.

C. The Data Gathering

There are two different questionnaires in this study. One is the innovative project questionnaire which include thirteen question about how student feel about this new method in class and if they are agree this class help them improve themself. Another questionnaire is regular digital one for college to evaluate if student satisfy with the course, which contain fourteen questions.

IV. Findings

The first part is the statistical results of the innovative project. The paper questionnaires were a sample of 286 Servings. There are six teachers teaching innovative courses for second-year students. The overall returned samples were 267 students and the response rate was ninety-four percent. And the scores of satisfy in course is almost ninety. Here is the most student answers feedback in Table II.

TABLE II: The Feedback in Project

Ranking	Most Feed back	Attitude
1	The teacher taught it very interesting.	Positive
2	Find out where i don't know, and how to work in teams.	Positive
3	Learn to find the answer by myself.	Positive
4	Can discuss homework with classmates in class, it is awesome!	Positive
5	Too much homework.	Negative

The second statistical result is the regular evaluate in course. It usually takes two times, in the middle and the end of course. We use the average as our questionnaire result. As the Table III could tell that the average score is around eighty. And the response rate is around seventy-five percent (see Table III).

TABLE III: The Regular Evaluate in Six Courses

Course	Class	Response Rate	Average Score	Standard Deviation	Variance
3D Design	A	90	81.11	14.63	214.12
Game Design	B	96	75.23	20.18	407.35
Game A.I.	C	57	88.79	16.46	271.05
Graphic Design	A	77	83.62	15.06	226.74
Multimedia Design	B	63	79.41	14.55	211.78
Animation Design	C	67	74.17	21.38	457.02

Results in this study are not fully covered, and must be interpreted cautiously. The data on teaching methods do not come from direct observations of classrooms, but from students' and teachers' reports. The information collected in both surveys is cross-sectional and therefore other relevant characteristics about students, teachers and class atmosphere remain unobserved.

V. Discussion and Conclusion

This section looks at teaching methods, and the relation to student achievement, based on students' grade results and on evidence provided by students who responded to the student questionnaire.

As described on the previous section, we could find out the difference between two questionnaires results. The first questionnaire which use in the project is paper type. It obviously influences students' answer, because they have to hand over this questionnaire paper to their teacher who still not gives the student course score. And the teachers who need to satisfy the government, they have to make the returned samples as a high rate. Then, we could have a glance on the regular questionnaire. The response rate is around seventy-five percent; there is eighteen percent gap in students' respond. And the regular questionnaire evidence the class students satisfy score is around eighty, there are ten point gaps between the paper and digital survey. It seems student is not that like the innovative courses. But the standard deviation shows about twenty point range for the satisfy score. And the variance also tells the data is quite dispersed. We could take it as, there are some students like the innovative courses, and some are not. Students are differing in how teachers use these types of learning methods. Some feel more comfortable with particular methods, some are not. Maybe students give different weight to particular learning methods or teachers when they are faced with new information.

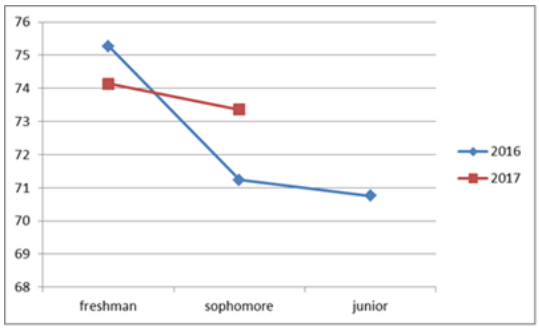

Fig. 1. The tendency to decline in transcript.

The most interesting is such as this type of innovative course project have had proceed for several years. And the Apartment of Design also participates for several times. Our students should be improve and learned well. However, when we investigate the transcript of students, the grade shows tendency to decline for each year students. What does it means? Isn't our new fancy teaching way have click their mind to open to a new world? Why some of our students do not like the innovative courses? It may because our education in curriculums defines what is expected of each question, and textbooks conform to these standards. With appropriate instruction and practice, students trained to answer as exactly to each other. But when it comes to the design area, innovation is prized and different from others. The tradition

of teacher-centered classroom and a culture valuing "harmony" and "humility" is made our student are feel resist to the change in the class.

For another case, the two continue course one is lecture with homework another is Cooperative Learning and Case Method. The first course satisfies score at 90.61 and the second one is at 90.24. It seems not that difference, but still shows a decline. From discussing the results under this construct, that teacher definitely think new pedagogical is the best teaching method to help the students develop in their thinking and therefore improve in their problem solving skills. But the validated of this conclusion is a decline of students' satisfy and their grade. Hattie said that we have to get a balance between teacher- and student-centered approaches [4]. Maybe not all our students are suit for these new teaching. For the new pedagogical come from west, and who we rooted in cultural differences. A research show that the learning pedagogical might differ across students [12]. Therefore, teacher should find which pedagogical could give clear effectively teach design to students, as this method can push students' self-confidence, enthusiasm and creativity, and encourage deep order of thinking which this is really why we carry out the new innovated in teaching.

The research found that teachers make use of new pedagogical as a teaching method in Design. And it discovered that teacher's performance well in their classrooms, and satisfies most students. But some students are still not got used in new teaching way, and most students' grade decline. This begged the further question: do our students really improve by these new pedagogical when they are learning in Design? As we know our Design cover not only esthetic but also mathematics. Maybe the evaluation is not in the right way, or still there is a gap between cultural differences. In order properly educated our students, it is best to place the students in the suitable pedagogical which it would be acceptable by them. It was important to find this out as it formed the basis of the research. Teachers are important resource in the teaching and learning process and their professional skills training as well. It is what teachers think in the classroom that shapes the kind of learning. Maybe not all the teacher can overcome the challenges in new fancy teaching.

For the further research, we suggest maybe try humanities and culture background to find out the reason why this would happen? Maybe it could not just student issues but also the teachers.

Education is based on the respect for individual values, which is relatively lacking in our traditional oriental societies [13]. Although Taiwan's education reform has walked out of bondage towards openness, but the historical knowledge, cultural understanding still live in our core values of Taiwan society. We know that the education cannot be detached from the reflection on and the revival of one's own culture. Truly by using any teaching methods well, teachers can direct their classroom towards success in raising students' both engagement and achievement. But to any pedagogical framework, the most important is educator must to consider in: whom they are teaching; who their students are, and what the class goal is. When these are considered, and one more thing: our culture background and the connected to social values.

Conflict of Interest

The author declares that there are no competing financial interests.

Author Contributions

All authors contributed to the writing of the final manuscript.

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