

NEW METHODS TO IMPROVE TEACHING QUALITY IN THE NEW ERA - A STUDY BASED ON AALTO- TONGJI DESIGN FACTORY TEACHING PEDAGOGICAL DEVELOPMENT PROJECT

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ABSTRACT

The Aalto-Tongji Design Factory in Shanghai is a creative environment bringing together universities, business and society to create new ways of learning, research and innovative collaboration. As part of the Aalto-Tongji Design Factory teaching pedagogical development project, from May to July 2011, the interdisciplinary students (include industrial design, environment design, visual communication design, and digital media design) and faculty team investigated on new methods of teaching to create better learning quality in the rapid changing age, looking at the aspects of new avenues for high engagement in the process of learning.

This paper presents the design, process and results of teaching the course “Design History and Theory” with the aim of developing a concrete model of deep learning through innovative teaching, working and evaluating methods.

This paper also examines how those methods of teaching can improve in design education. After the teaching practice, feedbacks are collected to analysis whether the hypothesis can be proved or not. The research project is still at an early stage. The findings so far are that the new methods make a significant impact on the students in this course by improving engagement and long-term memories, and those methods are suitable for other similar teaching circumstances of basic design theory education to interdisciplinary students.

Keywords: Teaching methods, environment, industrial design, teaching quality, multidisciplinary

1 THE ERA CONTEXT AND CURRENT CHALLENGES FOR EDUCATION

In the new era, traditional fundamental design education in the old system continues to face many challenges. A) In the traditional education system it is widely assumed that passive listening to a lecture could somehow transmit knowledge from the teacher to the student. Learning is still also most commonly assessed by a written exam, which emphasizes the ability to memorize and recite details (Arbauch and Benbunann-Fich, 2006). Nowadays classes are becoming larger and it becomes harder for teachers to transmit knowledge and assess the process of deep learning by just giving lectures and exams; B) Moreover, students in the new era have too many channels to gather information which reduce their focus on listening in classes or long-term memories. The knowledge in teachers' lectures is no longer mystery. How to attract their attention and get high engagement is at the crux of deep learning. C) The curriculum is more multidisciplinary. As for industrial design, the fundamental courses contain knowledge about design, material science, ergonomics, engineering, technology, and computation design etc., all of which include a significant independent thinking ability requirement. How to help the students to develop ability of self-learning and independent thinking will play a major role in today's education. D) In China, the main objective of high education is to train the skills of problem raising, proper analysis and problem solving. However, as Breslow stated, listening to and watching a lecturer and consequent recitation of detail and facts is clearly not the optimal avenue for students to absorb the skills that are necessary for sophisticated problem solving (Breslow, 2001). Teaching fundamental design courses with high quality is thus clearly a challenge. On one hand, mastering fundamental knowledge is an essential part of the learning process. On the other hand, in the rapid changing age, achieving a deep learning process, where knowledge is created or constructed by

every learner is difficult to achieve in the traditional instruction and classroom setting (Katrina Nordstrom, 2011).

A Chinese proverb says “what I hear I forgot; what I see I do remember; what I do I understand”. Traditional education and lecturing approach is not proven as the best method to enhance deeper understanding. According to Angelo modern education demanded a change in professor’s perspective and work in order to increase student activity and not letting the professor do most of the work in the classroom passively observed by students. Higher learning an active and interactive process results in “meaningful long-lasting changes in knowledge understanding, behaviour, dispositions and appreciation” (Angelo 1993). In such a learning environment, the instructor functions more as a consultant rather than as the conventional teacher (Johanssen et al. 1995). Genuine engagement can only be achieved by active collaboration in an environment, which fosters a shared, multidirectional process of teaching and learning (Rice, 2004).

2 PEDAGOGICAL PROJECT INTRODUCTION

The Aalto-Tongji Design Factory (ATDF) in Shanghai Tongji campus shared the same teaching philosophy with Aalto University Design Factory(ADF) is a creative environment bringing together universities, business and society to create new ways of learning, research and innovative collaboration. Accordingly, the ATDF teaching pedagogical development project is aiming at encouraging and supporting the professors to make use of the Design Factory’s environment and teaching philosophy in a concrete way. The professors are expected to experimenting new ways of teaching and feedback on the new approaches.

As part of the ATDF teaching pedagogical development project, from May to July 2011, the interdisciplinary students (include industrial design, environment design, visual communication design and digital media design) and faculty team investigated on new methods of teaching to create better learning quality in the rapid changing age, looking at the aspects of new avenues for high engagement in the process of learning.

2.1 Themes and learning objectives of the course

“Design history and theory” course is a necessarily required basic course in all the professional design colleges or universities, which plays a vital role in helping the students to extend the background knowledge, expand the vision and inspire the design thinking. In College of Design and Innovation Tongji University, “design history and theory” has become increasingly important for design education, which is divided into two parts specialized different knowledge. The first part of basic design history was taught for bachelor students by Chinese in the second year and the second part is taught by English in the third year which focuses more on interdisciplinary, design thinking and design reviews.

In this pedagogical project, we choose the second part of “design history and theory” course to do a series of teaching experiments. The course is taken by industrial design, visual communication design, environment design and digital media design students, who have passed their first part of the course. A total of 54 students attended the course and they were distributed into 9 interdisciplinary teams where they need to transform their knowledge to each other.

For the course, 4h per week are scheduled during an 8-week period as well as an additional 4 unscheduled weekly hours in this period. Each team was expected to finish two in-class tasks and one group assignment with non-conventional presentation. Students with the same expertise belonged to a subgroup that was responsible for one specialization. For the final assignment the students were asked to choose among given subjects.

As the students have established the understanding of the basic design history knowledge, the aim of this course is to:

- a) Develop the capability of independent thinking about design history and theory, pay attention to develop the students' distinctive view.
- b) Outstanding knowledge practicing, pay attention to the combination of history and reality.
- c) Develop the professional foundation theoretical study.

3 PEDAGOGICAL APPROACHES FOR HIGH ENGAGEMENT

Traditionally, the second part of the course “design history and theory” in Tongji University was taught in classroom with lectures including main knowledge and images and the student got most of

the knowledge by passive listening and recitation of detail and facts. The evaluation was carried by written exam to test whether the student could remember key knowledge and develop objective views for design history and theory.

While, according to Leidner and Järvenpää (1995) students learn better when they are provided with the opportunity to discover concepts rather than being formally instructed. This is the original pedagogical motivation for the course, under which we implement two approaches about innovative teaching and expression means, teaching and learning environment to experiment whether these new approaches of teaching could make improvement on teaching quality.

The goal of this pedagogical experiment is to develop the education to a more student centred direction with innovative ways of teaching to encourage interdisciplinary collaboration, combining theory and practice, develop ability of problem solving and independent thinking.

3.1 Approach 1: innovative and non-predetermined teaching and presentation means

This approach add group task in class, group assignments after class, and group presentation to the course. The goal for this approach is to explore how deep-learning can be promoted by allowing students to work on assignments without any specific pre-determined result and to present their work by innovative and non-predetermined presentation ways. Therefore, students could use drawings, tools, materials, videos, movies, music, models etc. to finish and present their tasks. It is important that the students begin to appreciate that there is frequently a need to be able to express oneself by innovative means and would get better results than typical ones (Katrina Nordstrom, 2011).

3.1.1 In-class task

For the first two weeks, there were short lectures about the main knowledge in design history and theory to indicate some key points and through different views showing the ways of independent thinking. After the lecture (about 40mins) a group task was designed to warm up the group collaboration and guiding the students to non-conventional and non-predetermined topic expression.

Each group were randomly assigned to an envelope with disrupted knowledge messages inside, which could be reordered and spliced to a complete article about a topic of key knowledge in design history and theory (Figure 1). Inside the messages, all the words indicated the topics were replaced by asterisk. Each group had 30mins to read, understand, reorder the messages and guess the topic, then present their given topic to all the class in 10mins without telling the “topic” directly. The presenting means were open and innovative expressions were welcome. The other students who understood the expression and got the topic correctly would have an extra 5 scores (hundred-score system was used). After class all the students were required to give scores for other groups and feedback on their learning.

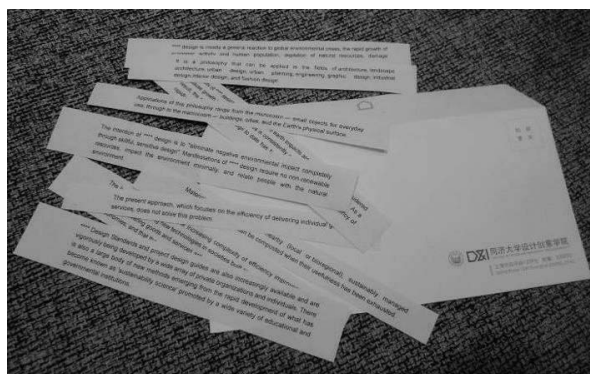


Figure 1. In-class task

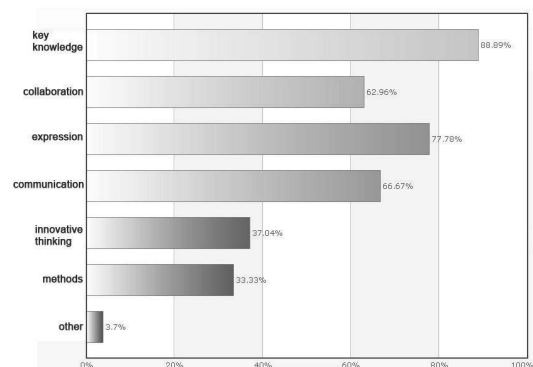


Figure 2. What you have learned in this course?

3.1.2 Group assignments and presentation

After the first two weeks warming up, every week there were lectures or discussions and a minimum of 3h of group work was required. Each group was given a specific topic about the course knowledge, they were required to establish their own understanding and views then prepare a 30 minutes innovative presentation to the class. At the end of the course, all nine groups gave their 30 minutes presentations successfully by short play, hand drawing poster, video, and model etc. After the

presentation, each student gave written feedback on every presentation and questionnaire about the whole course.

In the questionnaire the students were also asked to list three important themes or working methods that they had learnt during the course. The feedback shows that the students had learned design history and theory knowledge, collaboration, group work skills, communication, expression, independent thinking and innovative thinking (figure 2). Moreover, students stated that “I learned how to use the most unique and simple way to solve problem and express the view”, “innovative express skills helps to develop independent thinking”, “many kinds of communication and presentation skills to attract the audience”.

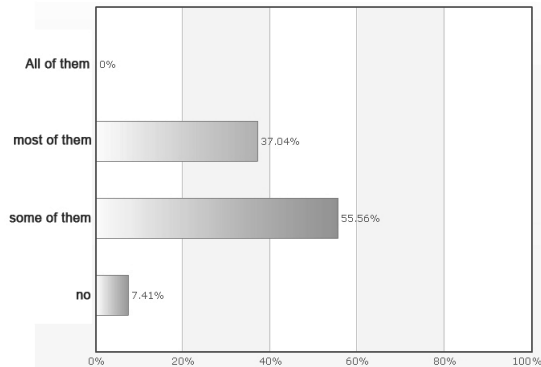


Figure 3. Do you still remember the topics of other teams?

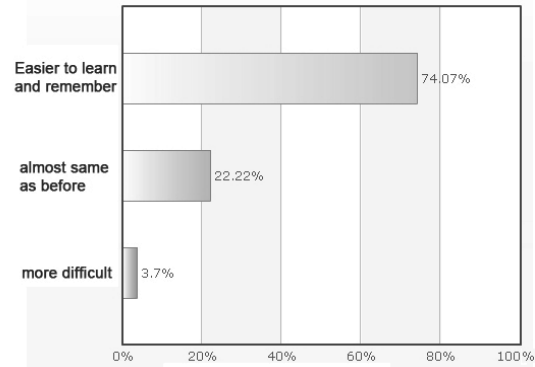


Figure 4. Compared with earlier course it was:

Although some students’ feedback complained that they spent too much time than imagine on the course work, other feedback at the end of the course was dominated by positive replies such as “learning is deeper when you are interested and want to engage more”, “the group work encouraged to discuss and it also helped to understand the course topics with interdisciplinary views”.

In addition, the students feel that they had not only genuinely learned about their own topic they also had learned significant content from presentations given by other students. This, from a teacher’s point of view is a major achievement, when comparing to lecture-giving teaching method or using the traditional PowerPoint or written presentations. The other questionnaire after 6 months of the course shows the optimistic results that only 7% of the students can’t remember other teams’ topic, while 37% still remember most of other team’s topic (figure 3).

Based on the feedback of the course, it was evident that student got good learning outcomes from the non-conventional course teaching design and the innovative learning and presentation means (figure 4). Compared with the first part of the course in their second year, 74% of the students felt it’s easier to learn and remember course knowledge in the new teaching and expression method.

3.2 Approach 2: How Environment could influence teaching quality

Today there are many new technology and facilities help the education process and presentation means. Therefore, for promoting learning engagement, the students should be provided by environment with physical and emotional elements improvement. Deep learning is supported by an environment that favours activity and experience as it fosters immediate engagement (Biggs, 2003; Holtham and Courtney, 2006). Accordingly, in the rapid changing age, the students and teachers have strong demand to be provided by inspiring and innovative learning spaces, where formal and informal activities beneficial to learning meet. With such argumentation, The ATDF learning space sharing the same concept with ADF is the symbiosis of the state-of-the-art conceptual thinking and multidisciplinary hands-on doing (<http://www.aaltodesignfactory.fi/>), which encourages integration of active learning tools to visualize, explore, and evaluate feasibilities of real-life challenges (Aspden and Thorpe, 2009).

To test the result of how environment influence on teaching and learn process, the first week in-class task was taken place in traditional classroom facilitated with projector, long table, and whiteboard (figure 5). The second week it was hold in ATDF (figure 6) with free space arrangement which somehow promote communication and creative thinking.



Figure 5. The first in class task in classroom



Figure 6. The second in class task in ATDF

The questionnaire result after 6 months of the course shows the difference of long-term memories compared with the first and second week in-class tasks. There are about 55% of the students still remember their first task knowledge and over 81% remember their second task hold in ATDF (figure 7). Additionally, students stated that “innovative spaces help to motivate inspiration”, “the ATDF spaces is a reminding to avoid routinism”, “free atmosphere of the class allows us much broader means for learning”. When asked what elements a good learning environment should include, the answer ranked in: free atmosphere, flexible space arrangement, projector and multimedia facility, white board, Wi-Fi, and laptop-using seats.

For teachers the change from the classroom to a space such as ATDF is not necessarily a challenge, but it does require a significant amount of preparation to get the maximum use of the space. More specifically, the teachers in this course also stated that “it is important for the teacher to become part of the learning process as both teachers and the students need to retrofit their traditional roles and ways of learning”.

Overall, it may be concluded that it is clearly beneficial for deep learning by using non-conventional environments for teaching and learning.

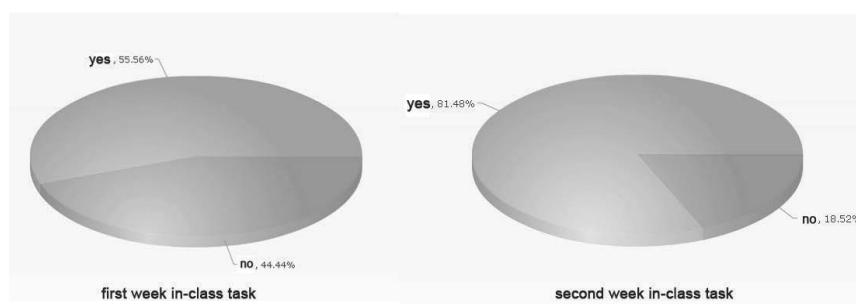


Figure 7. Do you still remember the in-class topic your team chose to express?

4 QUESTIONNAIRE

The questionnaires are used as indices whether the hypothesis can be proved or not. At the end of the course, students were given a course-specific questionnaire including the immediate feedback about the course learning, the collaboration, and their comments. Additionally, 6 month after the course, the students were given another questionnaire to test long-term memory and further feedback when they have opportunities to use and reflect the knowledge and skills they had learned through the course.

The results presented and discussed in this paper are from the outcome of the two questionnaires and the students’ writing comments right after each presentation. The number of students participating in the questionnaire is 53, hence the outcome of the study may only be considered as an indicating trend.

5 CONCLUSIONS

Results from the questionnaire are to some extent verified with the hypothesis of the teaching experiments. The learning outcomes were certainly achieved and exceeded all expectations from the original objectives of the course. Students' feedback for the course shows the new teaching methods helped to develop understanding and personal view of the knowledge, making interdisciplinary knowledge connections, and storing them into deeper memory.

Questionnaire results also indicate that the course reviewed previous learned knowledge and was considered as a good supplement to previous courses. Interdisciplinary collaboration during the course was appreciated; but it was also described as a challenge. The students were active and worked independently. Moreover, the students had the opportunity to work in interdisciplinary team and fight for a good overall solution instead of focusing on reciting knowledge passively.

The environment in ATDF is extremely well suited for teaching in this background as they create a sense of working together with interdisciplinary student and the free atmosphere for creative thinking, which help both teachers and students to retrofit their traditional ways of teaching and learning.

Most importantly, as Spence stated the role of the teacher is changing from focusing on being a teacher, to a designer of learning experiences (Spence 2001). For the teacher the amount of work in this course is typically high for the first time a course is implemented, but will be less demanding as the course becomes part of the regular curriculum.

The generality and validity of the present study is limited by the fact that our investigation is carried out the first time the course was offered, which limits the amount of data. No reference group could be established and it was not possible to test the student's qualifications in long term. It is evident from the current result of the study that students were highly engaged and motivated by the innovative teaching and learning process, and its contents are suitable for other similar teaching circumstances of basic design theory education to interdisciplinary students.

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