

## Learning by teaching. An inquiry into the research methods of the active practice in design education.

Irina Suteu<sup>a</sup>, Francesco Galli<sup>b</sup>

<sup>ab</sup>Politecnico di Milano

*Due to its multidisciplinary aspects, the field of design is an open terrain in constant change. In this context the design education and the methods of teaching have to be constantly reviewed and updated. In order to complete this task, a research into the pedagogical practices has to be carried on, and to become almost as a “behind the curtains” activity for the teachers. A considerable extent of literature shows how design students work (Cross, Dorst, McDonnel, Stempfle); however most of the times the studies place the researcher/observer in a distanced position with respect to the working group. The following paper will consider several pedagogical situations, in which the active involvement of the teachers as designers was necessary. Furthermore analyzing the examples presented it will be shown how a series of research methods have to be used in order to insure the objectivity of the observation. For this reason it will be shown how the action research methodology can provide important insights for creating a methodological framework specific to the characteristic of the study. In the attempt to avoid any ambiguities about the notion of “action research” it will be underlined how the pedagogical action research refers to the studies and approach of Kemmis, Whitehead, and Nofke. In conclusion we suggest that instead of regarding the pedagogical content as a monolithic body of knowledge presented to the students, the richness of the pedagogical experience comes from the human interaction with the working group and can be seen as a work in progress puzzle that has to be solved with the active involvement of the students and teachers.*

**Keywords : Teaching, Design methods, Action research, Interactivity**

## 1. Introduction

---

In 2001, Alain Findeli proposes rethinking design education for the 21<sup>st</sup> century in an insightful and groundbreaking article (Findeli, 2001). After having compared three different models that have shaped the design discipline, Findeli shows how the design curriculum has changed throughout history. Starting from “the new world” model proposed by Gropius at Bauhaus, to the “new man” one transferred in Chicago at the new Bauhaus by Moholy-Nagy, and arriving at the “new culture” proposed by Maldonado in Ulm, the author underlines the different levels of integration of the three main design ingredients: art, technology and science. He argues that historically the design intervention is seen as a causal link between a problem and its solution. In this situation Findeli points out how the design professional is placed outside the system and acts almost as a physician that gives a diagnosis and prescribes a cure without being involved in the entire treatment process. Instead he proposes a holistic approach where “the problem” is rather seen as a momentary, specific state of a system, in which the designer and user are among the various stakeholders. In this way,

A new logical structure of the design process is:

1. Instead of a problem, we have: state A of a system;
2. Instead of a solution, we have: state B of the system; and
3. The designer and the user are part of the system (stakeholders).

The designers are not seen only as problem solvers but merely as active participants having to manage the various functions of the system.

Having made a snapshot of an extremely contemporary way of reasoning in and about design, several questions come forward: what kind of education model can adapt to fit this logic? Is the traditional student-professor dynamic still valid and reliable?

In the next article we will attempt to answer this questions by bringing Findeli’s argument into the midst of the design education. In other words we will address the question of how can design educators immerse themselves into the system in a neutral way, in the mean time influencing an actual state of facts through action?

## 2. Designers and teachers

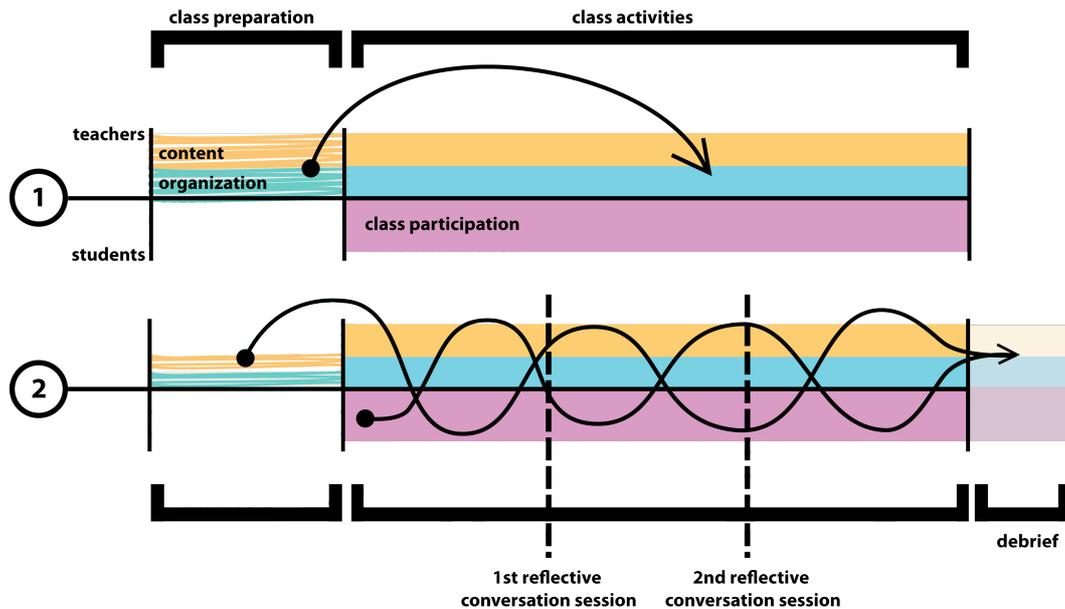
---

Being a hands-on practice, the design discipline requires a multi-faceted education that prepares students to embark in real life projects in design consultancies. Among the required qualities a designer has to have in this

case are for sure the skills acquired in the simulated conditions of school workshops and classes, but most of all the capability to integrate, communicate and be part of a team that most of the time gathers professionals from very different expertise fields. In other words, the ability to be part of a complex relational system that involves actors and roles in a continuous flow (Czikszenmihaly,1990). The complexity of design becomes visible only when being involved in the flow having to cope with the confrontation of tight schedules and the intricacy and sometimes novelty of tasks to complete. Regarded this way the design practice is not anymore a series of design problems that have to be approached by developing several problem-solving strategies (Dorst, 2001), but a continuously changing activity to which the designer has to adjust. The difference in the two models becomes even more evident when reflecting on the status of knowledge from *applied* to problem solving, in the first case, to *acquired* through activity, in the second case. In this scenario, the question is: how can students be prepared to enter into the game, and what kind of skills are to be involved by teachers?

The teamwork of design students has been previously studied in several literatures. Cross provides a good example showing the protocol of the teamwork and emphasizing the importance of the social factors in group dynamics (Cross et al.,1995). He underlines how the sequential steps taken in the design process are intertwined with the affective bond created between the members of the group. Looking even further into the psychological aspects of the group work, Stempfle and Badke-Schaub offer a generic step model of the design team activities (2002, pg.48). Here the previously mentioned protocol is regarded in the holistic perspective of the overall activity of the design group. What is however particularly interesting in the cases cited, is the distance taken by the teachers from the studied group. For obvious reasons the researcher acted as observer in order to testimony and thoroughly annotate the group dynamics. This enabled a distance from the experiment and ensured the neutrality of the observation. This kind of inquiry however doesn't give space to the heuristics of teaching and practicing process, frustrating the instructor of the confrontation with the different, and perhaps fresher ways of reasoning employed by the students. Taking into account that a majority of the design teachers are also practicing designers, this could also be seen as a missed opportunity to innovate the way of thinking about the design process. What we propose is the qualification of an already existing informal practice, in particular in mixed teaching teams of professors and experts, of analyzing the ongoing class activities. Taking a step forward we argue that the considerations made about the nature of the content and the class organization has to concretize into action. By implementing this practice of self-analysis and readjustment to the incoming conditions,

the teaching experience becomes more fluid and accommodates a learning process. The below scheme shows the traditional and most used teaching sequence (1) and compares it with the proposed one (2). Coming back to the initial model by Findeli, who proposed the design process in terms of a system, in the second case it can be seen how the interaction between the teachers and students alters the system from state A in the initial phase of the class activities to phase B in the end of the class. In the second case the final phase marks an important and not always employed practice of debriefing.



The second scheme shows also two reflective conversation sessions that underline a research method specific to collaborative action research (Cochran-Smith and Lytle, 1993)(Hollingsworth,1994). In particular Feldman talks about conversation as a research and inquiry method (1999) underlining the importance of “long and serious conversations” that go beyond the purpose of the immediate application into the teaching practice towards a more deeper understanding of the student and teacher interaction in classroom. We will come back to the relevance of adjusting and implementing educational action research methods in the design classrooms further on in the paper.

### 3. Learning by doing

In order to support the argument with concrete examples, the next chapter will take into discussion the role of the professor in the teaching process, arguing that traditional design education that introduced instructors and students on opposite sides has to be reconsidered. In the next part we will present two different situations in which teachers learned and worked collaboratively with students. In the first example the multicultural

component of the student group as well as the unfamiliar setting encouraged teachers to enter into a fluid process of verifying and adjusting the proposed content. In the second example the game design brief made teachers and students, playing and learning together for the designed artifacts. Both situations brought to attention the necessity to apply a flexible scheme of teaching and analysis of the process and results.

### **3.1 Adjusting teaching actions to a multidisciplinary and multicultural class.**

In 2009 two of the authors had the opportunity to participate in a charette organized by Institute Without Boundaries at George Brown College in Toronto, Canada. The complexity of this teaching experience came from various factors. Firstly the brief that asked students to design 10 different typologies of infill units in an existent social housing project in Toronto<sup>1</sup>. Given the particularity of the target users, low income families living in subsidized houses, the project needed a multidisciplinary team that can address the cultural and social issues of the community members, and articulate them into an architecture project. For this reason the IWB students studying system and strategic design teamed up with architecture technology students. Secondly, the lectures and revisions took into consideration the necessity to provide students with visualization skills that will help them individuate and represent synthetically possible living scenarios, even before proceeding with the architecture project (Pillan, Suteu, 2010).

A third factor that augmented the complexity of the teaching process came from the very limited amount of time of the charette, and workshops in general, in this case of only one week. This on the other hand gave teachers and students the opportunity to work very closely together and with an intense rhythm that cannot be achieved in a normal class situation.

Finally given the large number of architecture technology students in comparison to system and strategy design students<sup>2</sup>, presented the teachers with the challenge to organize the groups and briefly prepare group leaders, before the beginning of the charette and giving advise and support on group (small) conflict mitigation during the work process.

It is important to stress out how the flexibility of the working space was vital for the proceeding of the activities. Even if the initial lectures on

---

<sup>1</sup> Flemington Park Charette was endorsed by Toronto Community Housing and Coordinated by Luigi Ferrara, Michelle Hotchin, IWB; Stephanie Adams, George Brown College; Mark Guslits, HOK Architects; Mazyar Mortazavi, TasDesignBuild.

<sup>2</sup> 8 IWB students and 90 Architectural Technology students.

interaction design and social aggregation was given in a traditional setting, the groups shared the working space, dividing it according to their activities that involved brainstorming, drafting online and offline, model making and revisions with teachers. In the same time all students and teachers had the possibility to look at each other's projects, learning from each other and also entering into a competition mood. In this way teachers constantly moved from one group to the other checking on their work and attending to their requests when needed.

### **3.2 Teaching, designing and playing**

The next example presents a different situation in which the immediacy of the teacher's action came from the very subject matter of the content to be taught. In May 2011 we organized a five-days workshop at the Politecnico di Milano, Faculty of Design. The workshop was aimed at the design and the prototyping of board games using psychological phenomena as a source for inspiration for game mechanics and dynamics. The workshop was named "Guess How?" in a nod to the classical board game "Guess Who?". None of the participating students had previous game design experience nor any academic preparation in psychology or cognitive science. They had four days to write a concept for the game, design the rules and the components, and complete a working prototype. During the fifth day we tested the games together with them and gave the final feedback.

As the workshop was for us a testing ground of a theory, or an experiment, we had to share this vision with the students. In simplified terms we had to share with them this concept: "there is evidence that cognitive sciences may be a tool and an inspiration for game design: let's try it out".

To set this as the mood of the workshop and to help the students connect with us and feel free to share their discoveries and advancements, we had to adapt the style of the workshop from a more traditional teacher-student approach.

As "games" were a core theme to the activity we felt that sharing the moments of play would have been the natural way to implement our approach. In fact, the very process of game design is an iterative one that requires participants to the design to constantly play the game.

We did this in two main occasions: at first during the lectures, which included games as examples and demonstrations. Later, we spent the remaining four days testing the games with the students, observing them play, and encouraging the development of the funniest parts of their designs by sincerely expressing our feelings.

Laughter, exclamations, and body language are essential to the mood of play but are not usual form of communication between students and teachers: we wanted to go beyond the conventional relationship to preserve the qualities of playful design for games.

In this spirit we invited Lorenzo Silva from Cranio Creations to give the students a lecture on board game design and provide feedback to their design. Silva is a board game author and a publisher, and he is used to testing dozens of board games every year. Of course, even in the professional area of game design and in the actual marketplace the same rules apply: Silva had to become a real player to experience the fun parts of the game he was testing, that is to appreciate the emerging dynamics that games encourage when played right (e.g. “bluffing” in Poker).

During the lectures we had the students try some games that we considered meaningful in regards to the workshop's topics. We provided no instructions other than the game rules (or the game links in case of videogames) and later asked them what was special about the games and why they thought we asked to play them.

This activity was done leaving free time for the students to play the games by themselves or in small groups so that they could begin sharing the experience of play as part of their design process, something that does not happen to often in the context of university. During the whole duration of the workshop we tried to be always moving between projects: we would observe the games briefly, ask the students what progresses were made, if they encountered any particular difficulty in design and if they were ready for a play test. Students were encouraged to test the games as often as possible but we did not force them if they were in the middle of a specific design activity, like balancing the rules or brainstorming a solution to a design flow.

The class where the workshop took place had movable tables so we arranged them in ways that made easy moving from one table to another and sit around them. This let us drop-in/drop-out games easily and also encouraged students from different groups to have a peek at what their colleagues were working on.

#### **4. Mixed roles, how to sort them out**

---

The close implication of the teachers and instructors in following all the steps of the design project brings to light the delicate line that separates the two roles. While the teacher traditionally stands on the other side of cathedra, the designer will tend to contribute to the brainstorming influencing in this way the creative process. It is the presence of these

mixed roles that asks for methods that will enable the involvement while maintaining the neutrality of the observation. In both cases presented the short duration of the charette – workshop, placed teachers in the mixed role of teacher and practitioner. In the first situation the strategies developed to take a reflective and neutral stance were to take a physical and mental distance from the group and have a brief discussion on the way the groups worked from three points of view: the progress they made with respect to the deadline, the integration of both interaction visualization and architectural scheme and the management of the group members. This type of isolation strategy was possible and made easier by changing the language of conversation from English to Italian.

In the second case the last phase of the game workshop involved two external actors: a game developer and a fellow colleague which both brought their different views regarding the game experience, from a practical point of view and respectively from a research perspective. In this case the third party strategy was particularly effective because enabled the teaching team to take a reflective stance and acknowledge certain details that are difficult to grasp while immersed in the game. In this sense a list of parameters was decided before the test, and the outside teacher assisted to the session without playing.

To complete the abovementioned actions that can improve the pedagogical research in design the need for a consistent and articulate annotation came forward in both situations. By this we mean not only the disparate notes taken commonly, but also a more structured visualization tool that can offer an overall view of the class activities with all its facets.

## **5. Proposed methodologies of observation while immersed in the teaching process**

---

Some of the most interesting methods successfully employed for studying the creative process in action, come from social psychology and was initially introduced by Lewin as early as 1940's (1988). Action Research (AR from now on) addresses the gap between theory and practice by facilitating the involvement of researchers as participants *from inside* the [social] setting and not *on* it from an external position (Nofke 1994). In the educational realm AR was employed and proved particularly relevant for curriculum development (Kemmis, et al., 1993) as well as for articulating a coherent research while teaching (Altrichter et al. 2002). One of the most interesting approaches of AR, and the one perhaps most relevant for the purpose of this argument, it is the reflective study of the own practice and the reflective conversation on the process advancement with the other members of the team (Feldman, 2003). This reminds us of the reflective

practice methods of Donald Schon (1983), already well known, applied and discussed in the realm of design (Buchanan, 1992; Dorst, 2003; Swan, 2002).

While a close attention it was placed on the protocol of the design process in educational setting by Cross and Dorst, the conversation employed as a research method aims to engage a more profound oral inquiry process (Cochran-Smith and Lytle, 1993) into the pedagogical practice. In this sense, as shown in the examples mentioned before, two types of conversation, that are already present, but should be implemented consciously in the pedagogical design practice.

The first one refers to the active exchange of information in order to support the ongoing design process and decision-making. Here we refer to the fast conversations that teachers have while being immersed in the teaching and designing process and that could bring to surface problematic issues to be consequently discussed with students.

The second makes reference to the collaborative conversations ( Hollingsworth, 1994) that includes, and can also continue after the debrief phase of the design class or workshop.

Bringing the above-mentioned conversation methods in the realm of the design practice, annotating the conversation can become the starting point for engaging a collaborative action research process. As in the previously shown examples most of the time due the fast speed of the design classes, the only tangible result of the entire activity are the student outputs. Instead perhaps the most interesting and important part of the teaching activity is the knowledge exchange between students, teachers and partners, which in time remains in our memory only as an emotion. Once expressed and then externalized, in a visual manner, the experience and knowledge acquired becomes part of a collaborative repository that can be analyzed and improved in further instances.

## **6. Conclusion**

---

Looking at Findeli's view of the design process as a system allowed us to make a reflection on the way the design education can be improved. Although the examples underlined each had their own specificity, they helped identifying several important issues that have to be considered in the design educational process. If the traditional education class setting favored the distance between teachers and students, the design classes do not necessarily benefit from it. Instead, the close proximity helps a more personal interaction disassembling the two groups into novice and more experienced professionals. What happens in this case is a more fluid exchange of knowledge between different generations and a deeper

understanding of the design process in terms of an engaging and unique experience. The question at this point is how to better understand the short and long term implications of this approach, while immersed into the creative flow of designing and teaching? The Action Research has to be understood in this case as a methodology that can provide useful tools that have to be adjusted to serve the purpose of the design pedagogical activities. Taking into account two examples that presented a high level of complexity we drafted three strategies in which the conversation can be used as a research tool. Moreover we stressed out how the annotation of the overall activities can become a research tool in itself supporting a reflective conversation during and after the completion of the class.

Future work will bring together the strategies and methods drafted in the paper and test them in several class situations. The visualization of the annotation will be set-up in two formats: as a template prepared before the classes and as a series of guidelines to be observed, drawn and written by the teaching staff in his/her own way.

## **Bibliography**

---

Csikszentmihalyi, Mihalyi (1990). *Flow. The Psychology of Optimal Experience*. New York: HarperCollins Publishers.

Findeli, Alain (2001). Rethinking Design Education for the 21st Century: Theoretical, Methodological, and Ethical Discussion. *Design Issues: Volume 17, Number 1 Winter 2001*

Dorst, C.H., Cross, N. G., (2001) Creativity In The Design Process: Co.Evolution of Problem-Solution. *Design Studies 22*, pp.425-37.

Cross, N. (1995). Observation of teamwork and social processes in design. *Design Studies*, 16, pp. 143-170

Stempfle, J. and Badke-Schaub, P. (2002) Thinking in design teams - an analysis of team communication. *Design Studies 23*, (2002) 473–496.

Cochran-Smith, M and Lytle, S. (1993) *Inside- Outside: teacher research and knowledge*. New York; Teacher's College Press.

Holligsworth, S. (1994) *Teacher research and urban literacy education: lessons and conversations in a feminist key*. New York; Teacher's College Press.

Feldman, (1999). Conversation As Methodology In Collaborative Action Research. *Unpublished paper*. Retrieved from: <http://www-unix.oit.umass.edu>

Pillan, M., Suteu, I. (2010). *Making User Centered Design more affordable for collaborative service design*. Lens Conference Proceedings, Bangalore, India.

Adelman, C. (1993). Kurt Lewin And The Origins of Action Research. *Educational Action Research*, 1. Pp. 7-24

Noffke, S. (1994). Action Research: towards the next generation, *Educational Action Research*, Volume 2, No.1, pp. 9 — 21. Retrieved from: <http://www.informaworld.com/smpp/title~content=t716100708>

Kemmis, S. et al. (1983). *Orientation To Curriculum In Transition; Towards The Socially – Critical School* pp. 9-10; 26

Kemmis, S. (1980). Action Research In Retrospect And Prospect. *Proceedings of the Annual Meeting Of The Australian Research In Education*. Nov 6-9, 1980.

Altrichter, H., Kemmis, S., McTaggart, R. and Zubber-Skeritt, O. (2002). The Concept of Action Research. *The Learning Organization*, 9 (3) pp.125-13. Retrieved from: <http://www.emeraldinsight.com/0969-6474.htm>

Schön, D. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass Publishers.

Buchanan, R. (1992). Wicked Problems In Design Thinking. *Design Issues*, Vol.8, No.2, pp.5-21

Dorst, K. (2003). The problem of design problems. Expertise in design, [research.it.uts.edu.au](http://research.it.uts.edu.au)

Swan, C. (2002). Action Research and the Practice of Design. *Design Issues*. Vol. 18, No. 1 (Winter, 2002), pp. 49-61. Accessed on 16/09/2010 09:25: <http://www.jstor.org/stable/1512029>