Interrogating Futures in Industrial Design Education

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Abstract: Analyzing today’s needs and demands became insufficient to be abreast with the time. Hence, to keep up with the change or to achieve the desired change, futures studies is undertaken in areas such as economics, sociology and politics. The change rate upon time and designers’ need to keep up with it highlight the importance of futures studies at design studies. This paper aims to contribute future vision to undergraduate industrial design students, by forming a methodology based on futures studies literature, to be used in long-range future-oriented design (LFD) projects in undergraduate industrial design education. The study was based on action research scheme and designed in two cycles. In the paper, the results of these two cycles will be shared and the developed methodology will be introduced with its tools.

Keywords: Futures studies, Future oriented design, Causal Layered Analysis, Design methods, Long-Range Future-Oriented Design Methodology

1. Introduction

Designers, by definition of their profession, are correlated with future. At the present time, the rate of change accelerates continuously; so to keep up with the rate of change, to initiate change, to foresee the future and to direct the future, the need for varied tools has arisen. Futures studies have been carried out since the 1940s to foresee the future, to design it or to be ready for alternative future scenarios. Industrial design field has also adopted the futures studies and since the 1990s it has begun to be studied. The topics of; relation between futures studies & industrial design; the need to gain future vision for designers; adopting futures studies to undergraduate industrial design education have been examined up to today.

Humankind is exposed to complex systems due to the developments in technology and evolutions in socio-cultural structure. In order to cope with complex systems and problems in design, method usage is beneficial.

In this paper, it was aimed to contribute future vision to industrial design undergraduate students, by developing a methodology based on futures studies literature, to be used in long-range future-oriented design (LFD) projects in industrial design undergraduate education. The study has been

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handled in three stages: literature study, design process of LFD methodology and implementation & development of the LFD methodology.

The effectiveness and scope of the methodology were tested on LFD projects and the outcome of the implication of the methodology on other design projects is out of coverage.

Essentials of the methodology were transferred to a template design. The templates can be used by other professionals or students to advice LFD projects and to cover design students with deeper understanding on future vision.

2. The Relationship Between Futures Studies and Industrial Design

Analyzing today’s needs and demands became insufficient to be abreast with the time. Hence, to keep up with the change or to achieve the desired change, futures studies is undertaken in areas such as economics, sociology and politics.

The change rate upon time and designers’ need to keep up with it highlight the importance of futures studies at design studies. Thus, the futures studies began to be studied in various research papers, lectures, seminars and conferences have been organized with this theme.

Designers professionally deal with the future, as their profession is about designing products to be used in the future. Seymour (2008, p. 54) reaffirms and asserts that designers are natural futurists by producing products that take at least a couple of years to appear on the shelf. Cross et al. (1975) remark that “Visions of the future are particularly important for designers, because designers have to imagine both the future conditions that will exist when their designs actually come into use and how those conditions will be changed by the creation of their new design” (p. 2).

Evans and Sommerville (2007) state futures thinking, “the systematic study of the future, provides design with a structured approach to consider potential futures” (p. 1). Stefano Marzano defines a new role for design as “to anticipate and create preferable and sustainable futures through design” (as cited in Bevolo and Brand, 2003, p. 33).

Irmak (2005) highlights the impact of socio-technological changes on design and suggests that “we may look at Futures Studies to understand the change in design and to draw the future perspectives for design” (p. 1).

Evans and Sommerville (2005, p. 1) conclude that, design education needs to include an awareness of Design Futures Framework within its curriculum, if future-aware designers are to be developed. They highlight the power of Futures Studies as offering numerous design tools and techniques including forecasting, backcasting, prediction, trends, scenarios and blue sky thinking. According to the authors, in order to develop future-aware designers, these approaches are needed to embedded in design education system. In a similar way, Jensen (2005, p. 12) concurs and believes that “trend forecasting and future research methodologies should be a subject in the industrial design education program”.

3. Design Process of the LFD Methodology

The concept of future can refer to tomorrow, next week, 5 years later or 50 years later... Masini (1993) emphasizes the need of consideration for clearly stated specific time frames. Bell (2009) indicates that; “understanding the measurement and meaning of time is absolutely basic to futures
Dator (2002, p. 16) specifies the need of being clear about when practitioners refer to ‘the future(s)’. In a research, interrogating the future in general terms or specifying a fuzzy time frame like 20 to 50 years do not correspond to anything. Although the need to specify clear time frames is accepted by futures researchers, there isn’t any accepted standard of time frames.

Slaughter (1996) describes future time frames as “distinct periods of time ranging from pico seconds to millennia” (p. 276). Masini (1993, p. 32) defines future time frames as short-term Future, medium-term Future and long-term Future. Groff and Smoker (2015) present future time frames by Earl Joseph of the Minnesota World Future Society. Joseph adds two new categories to Masini’s future time frames: The Near Term Future and Far Future. Joseph classified the ‘future’ as near-term future (present to 1 year), short-range future (1 to 5 years), middle-range future (5 to 20 years), long-range future (20 to 50 years) and far future (50 years and more).

In 2003, to catalog a variety of time horizons used by futures researchers in their work and in their images of the futures, Brier (2005, p. 837) has conducted a survey study by sending emails to futures researchers. While assessing the results, he made a distinction between applied and academic futurists. His key findings showed that applied futurists working with organizations to generate foresight tended to use shorter time horizons. Academic futurists on the other hand, working on the futures of society as a whole, tended to use longer time horizons. Though, when discussing broad futures, both academic and applied futurists, use a 20–50 year time horizon (Brier, 2005, p. 847). Jouvenel (1964, p. 20) mentions that big changes in society connected with economic and technological change will occur in broad futures. In the light of this information, the time frame has been selected as 2050 (35 years later) for this study.

The purpose, aim and definition of Futures Studies differs from author to author. Some futurists define the concept with action. Glenn (1994) describes it as “to systematically explore, create and test both possible and desirable futures visions” (p. 4). Bell (2009) states that; “the purposes of futures studies are to discover or invent, examine and evaluate, and propose possible, probable and preferable futures” (p. 73). Inayatullah’s (2002) definition is similar but expanded critically as “the systematic study of possible, probable and preferable futures, including the worldviews and myths that underlie each future” (p. 37). For other futurists the ultimate goal often involves ethical issues surrounding mankind, society and, often, the have/have not gap (Masini, 1993, p. 30).

Slaughter (2004, p. 130) identifies four possible levels of futures work as pop futurism, problem-oriented work, critical futures studies and epistemological futures work.

Kuosa (2011) categorizes Futures Studies under three broad approaches:

1. The first grand area of futures research is the creation of interesting future images, visions and scenarios within prediction and utopia/dystopia perspectives.

2. The second area of futures research is its ability to support planning and decision-making.

3. The third area constitutes futures research that helps to solve the great global questions of all humankind. (p. 328)

In addition to Slaughter and Kuosa, Inayatullah (2002, p. 10) also proposes four approaches for Futures Studies. These approaches are predictive, interpretive, critical and participatory action learning/research.

According to literature review, Slaughter’s, Kuosa’s and Inayatullah’s futures frameworks were examined and classified under three main categories: visual, strategic and interrogative futures studies (Figure 1).
The aim of the Visual Futures Studies framework is to create dramatic, media friendly images of the future with or without futures research methods. Visual futures frameworks can be regarded as a creative exercise for the future. The aim of the Strategic Futures Studies framework is to generate short or medium-range future scenarios for problems that societies or organizations come across. Strategic futures frameworks include more technical research methods, which are better suited to product – case oriented futures studies; which is more eligible to organizational futures researches. Interrogative futures frameworks’ aim is to speculate now and the future to solve global questions of all humankind. The framework has a solution focused approach which regards the existing conditions problematic and applies critical thinking to gain a deeper understanding on the present conditions and create alternative futures by considering specific domains as sociology, psychology, environment etc.; therefore, interrogative futures framework was selected as the fundamental domain of this study.

In order to form the LFD methodology, interrogative futures studies was examined and critical futures studies framework came into prominence. Critical futures studies prefers to use subjective emancipatory methods and tools like futures workshop techniques, futures wheel and CLA (Kuosa, 2012, pp. 30-32).

According to Dator (1993, p. 1), Future workshops were invented to involve the people who were directly affected by the political decisions within the decision making process itself. It guides people in imagining alternative solutions by using creative thinking. The future workshops were examined and key points of the method were listed based on Vidal’s (2006, pp. 10-11) and Apel’s (2004, pp. 8-11) researches. These key points of the future workshops method provided guidelines as the theme, the number of participants, creation of the groups, the time table, the mentor’s role and consistency of the phases, for the implementation of the LFD methodology.

In the wake of future workshops, CLA, the most well known method of the critical futures studies field was investigated. CLA consists of four levels as the litany, social causes, discourse/worldview and myth/metaphor. Inayatullah (2004) defines the aim of the method as to research along these layers, to deepen the knowledge and to create transformative spaces for the creation of alternative futures. CLA is best used in conjunction with other methods such as emerging issues analysis, scenarios, backcasting and visioning. To compose a set of methods with CLA, Inayatullah’s conceptual framework for Futures Studies namely the Six Pillars Approach was examined. The pillars are defined as mapping, anticipation, timing, deepening, creating alternatives and transforming. They can be used as theory or in a futures workshop setting. In a workshop setting, they can be used in a linear sequential sense, i.e. from mapping to transforming, or by focusing on a specific pillar (Inayatullah, 2013, p. 45).
Figure 1. Classification of futures studies frameworks
Mapping and timing levels of the Six Pillars Approach are exploratory levels, which are aim at developing information on history and reflecting it to future forecasts. While the mapping and timing levels are problem focused, anticipating, deepening and creating alternatives levels are solution focused. Design thinking also comprises solution focused approach to create solution proposals, analyze, evaluate and improve them until the solution is satisfying. For this reason, mapping and timing levels were excluded from the study and continued to the study by examining the levels of anticipating, deepening and creating alternatives. The anticipating level consists of emerging issues analysis and futures wheel methods. Emerging issues analysis is a trend based method and the Futures Wheel method is a kind of structured brainstorming for organizing thinking and questioning about the future. The deepening pillar consists of CLA and Metaphors methods. Metaphors are already used in the CLA method, and it is a more integrative method, that deepens the knowledge and searches for different ways of knowing, to create alternative futures. The creating alternatives level consists of scenarios, CLA incasting and trajectories methods. The scenario is a familiar method to the designers and is often used in the design process. For this reason, the Futures wheel method from Anticipating pillar, the CLA method from Deepening pillar and the Scenarios method from Creating Alternatives pillar were selected to develop a methodology to be used in LFD projects.

In the literature, there are multiple scenario techniques with different approaches and different aims to use. Therefore, various scenario techniques were examined from Bishop et al.’s (2007) and Inayatullah’s (2008) perspective, and the most appropriate techniques to use in the LFD methodology were selected as incasting, SRI, double variable and integrated techniques. The incasting technique supports a deeper understanding on futures domains and motivates group study. Because the pre-builted scenarios are used, the efficiency of the technique depends on the mentor’s ability to manage the process and the context of the pre-builted scenarios. Integrated scenario technique supports critical thinking, but the implementation of the technique is more difficult. SRI and double variable techniques resemble each other in their use, ease, lucidity and effective results. Therefore, the double variable scenario technique has been selected to be integrated to the methodology. Decisions taken in the design process of the LFD methodology can be seen in Figure 2.

The outline of the methodology had been composed roughly by the methods CLA, futures wheel and double variable scenario methods, by taking advantage of future workshops method. The strengths, the weaknesses, the opportunities, the threats and the implementation format of the designed methodology were unknown. To eliminate this uncertainty, a systematic investigation was needed to test and develop the LFD methodology. Therefore, the study was based on action research scheme. Action research involves a spiral of self-reflective cycles to develop knowledge. Therefore, the research was designed in two cycles.
Figure 2. Development process of the LFD Methodology.
4. Implementation & Development of the LFD Methodology

4.1. The First Cycle

In order to observe the contribution of the LFD methodology to the process, the first cycle was planned in two phases as non-intervention period and implementation of LFD methodology. The first cycle had been implemented in a studio course at Doğuş University, Department of Industrial Product Design in 2013/2014 spring semester.

In the non-intervention phase, project groups were gathered together, the project topic was demonstrated and without introducing any methods they were asked to present their sketches and were given critiques. The aim of this phase was to analyze participants’ attitudes to the future oriented design project topic. Mentors shared their knowledge on leisure time concept with the participants. For three weeks, participants had been observed and in the sequel, preliminary assessment had been done. Preliminary assessment had been carried out to analyze the attitudes of the participants and challenges they were faced with. In the preliminary assessment process, formal group interview method was used and it was analyzed by interview notes, audio recordings, photographs and sketchbooks. According to the evaluation of analysis, difficulties faced by the participants during the first phase were listed.

In the second phase, CLA, Futures Wheel and Scenario methods were introduced to the participants and groups implemented the methods on their project topic. Second phase was carried on for 4.5 weeks. At the end of the cycle, participants’ thoughts about the cycle were gathered through questionnaire. The entire process was assessed by survey study, jury reports, sketchbooks, photograph and videos.

4.2. The Second Cycle

The findings of the preliminary assessment, implementation of the LFD methodology, and the questionnaire results of the mentor and the participants, were gathered together to compose the core knowledge of the second cycle. The second cycle was practiced in a workshop in 2014/2015 spring semester, at Istanbul Technical University, Department of Industrial Product Design.

In the first cycle, the time frame was not drawn clearly. The participants were confused without a clear time frame. Therefore, in the second cycle, a clear time frame was given as 2050.

At the first cycle, the participants met with difficulties in practicing LFD methodology. In order to introduce methodology and implement methods more effectively, a template was designed. The template was designed for introducing every step of the methodology one by one, with a plain language and visuality. In the first cycle, the participants’ method usage were analyzed and seen that A4 paper format was restrictive, so it was determined to use A3 paper format for the templates.

In the third step of the methodology, double variable scenario method was used for the scenario building process. The method was selected for its ease of use. In the implementation, it was seen that double variable scenario technique did not create a deeper understanding on the project topic. The other scenario technique, integrated scenario, was founded appropriate to use in the second cycle.

In the first cycle, the methodology was not used in the design development process. Thus, the second cycle was planned as a two-day workshop.
In the first day of workshop, after demonstrating workshop topic to the participants, groups were formed and one hour free time was given to them. In order to analyze how participants approached to workshop topic in their free time and to take their responses, preliminary assessment was done with groups. The assessment was done with formal group interview notes and photographs. According to the information gathered from the assessment, difficulties faced by the participants during the non-intervention period were listed. The list of second cycle was compared with the list of the first cycle, to analyze the differences between the first cycle and the second cycle. As a result of the comparison, variables excluded and the list of difficulties faced by students during the LFD projects was formed:

- The participants could not define the potential, probable or preferable futures
- The participants had put forward ideas about the futures but could not combine them to create scenarios.
- The participants could not identify the design problem.
- The participants were inspired by their own needs/wants and they created possible future scenarios, based upon these criteria.
- The participants believed that they needed to develop eccentric designs for the future
- The participants created design ideas based on tools, technologies and events in place of concepts.
- The participants could not develop a holistic view.

Findings indicate that students couldn’t define the potential, probable or preferable futures. They had imagined that there was only one future and they tried to find it out. This approach had led them to search for the possible future and they had only inspired from technological developments, films or foresights of famous futurists. Instead of thinking conceptually, they tend to think in terms of tools, technologies and cases. For example, they thought about interactive simulators, flying drones, popular science fiction films or air pollution risk; but in real terms, they didn’t think about the concept of leisure time. Not thinking conceptually prevented them to develop a holistic view. They had generated a variety of ideas about the future but they couldn’t combine them and create scenarios. The confusion, caused by the variety of ideas, prevented them from determining design criteria for the workshop project. They tended to be inspired from their current needs/wants and created possible future scenarios upon these needs/wants or they generated eccentric design ideas to make a difference.

In the second phase of the second cycle, templates were distributed to the participants and they were asked to use them. The templates were designed visually and literally so that the researcher didn’t have to describe them. During the process, the researcher observed the participants if they could overcome the difficulties encountered in the first phase, which were described above. Subsequent to workshop, formal group interviews were conducted and ideas of the groups concerning the process were gathered. Suggestions for further research were created with the findings obtained.
5. Conclusion

In accordance with the analysis of the observation and interviews, suggestions were created for the preparation of the design brief and implementation of the methodology for LFD projects.

In design brief preparation process, accurate time frame is needed to be given to the students (for example design of leisure time products/services of 2050), otherwise students were confused with the unlimited time descriptions (for example design of leisure time products/services of future).

Big changes in society, connected with economic and technological change, occur in long-range futures. 20 to 50 years time frame will be suitable for LFD projects. Specific design topics (such as design of washing machine) are limiting for students. Abstract project topics (such as leisure time, comfort and hygiene) are more suitable to unleash the creativity of students.

Vidal (2006, p. 10-11) and Apel (2004, pp. 8-11) suggest that future workshops should be carried with maximum 15-20 participants. Workshops with 8-12 participants will be more creative, synergetic and dynamic. If the participant number is bigger than this, the number of the mentor needed to be increased. In the use of methodology template, two mentors are better in controlling the time and active involvement of the participants. Mentor need to build a strong communication with the participants. According to the basic principles of future workshops, group study is encouraged. It is better to compose groups of 4-5 people who generate ideas through dialogue.

Throughout the design process, mentor needs to give desk critiques to groups and motivate them. Generally, one or few participants dominate the group work and the mentor needs to monitor groups to make sure that every participant is involved in the process. Introducing the workshop brief to participants clearly and implementing the methods properly are also crucial for critique, fantasy and implementation phases of the future workshops. In this sense, methodology template usage is facilitator and assistant. For each phase of the workshop, specific templates were designed and they needed to be distributed one by one. If a step is not completed as it is advised, it needed to be repeated before passing to the next step. In the process, participants can forget to record their ideas on the template. In such a case, mentor should control if participants record their ideas on the templates. Every type of information is valuable; so without discouraging them, participants should be motivated. Participants are inclined to limit themselves to a single design solution; therefore mentors need to open their minds. Asking open-ended questions can motive them to generate alternatives. Participants tend to think in concrete terms and mentor should guide them to think in abstract terms.

Formed methodology, according to the research results, was designed for LFD projects, so entitled as LFD Methodology. The website lfdmethodology.com was designed for sharing and developing the methodology with other researchers, designers or students.

The main purpose of the website is; to share the acquired knowledge with other people; to widespread the methodology; to develop the methodology with obtained experiences; or to encourage people for developing different solutions.

Website has been constructed under four main headings; background, how to use, download and contact. BACKGROUND page comprises the aim and scope of the methodology. In the HOW TO USE page, the methodology and template are introduced and points to consider are presented. Those who visit the website can download a free copy of the template from the DOWNLOAD page and use them on their projects. Moreover, reviews of the people who practiced the methodology earlier are located in this page. A contact form is created on CONTACT page for people who want to get more information or provide feedback.
In this study, futures studies frameworks were examined and interrogative futures studies frameworks were selected as it aims to speculate now and the future to solve global questions of all humankind. Two other categories, visual futures studies and strategic futures studies, can be examined in further research. Visual futures studies framework aim to create dramatic, media-friendly images of the future. The framework and its methods can be examined in short-term concept design projects. Strategic futures studies framework is for generating short or medium range future scenarios for problems that societies or organizations come across. Strategic futures studies framework and its methods can be studied in university–industry collaboration projects or a research can be done in cooperation with a company.

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