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Effects of Speculative Design Approach on Creativity in Design Education: A Method Suggestion

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Abstract

We are moving towards the future in uncertainty on our planet, which is changing at an unprecedented speed. However, it is also in our hands to find ideal futures by questioning alternative futures and to prepare people for these futures. Despite the rapid increase in global problems in such a major change, design education cannot be expected to remain constant and changing consumer needs and ecosystem problems can be ignored. This study deals with speculative design in the context of alternative futures to overcome more complex design problems. There are also studies on the question of how a design education that discusses ideal futures affects students' creative skills and future vision. The study argues that speculative design methods will contribute to the development of students' creative thinking skills by adapting them to industrial design education and offers a method proposal that can be applied using speculative design methodology regarding the solution of the research question.

1. INTRODUCTION

The acceleration of technology, which started with the industrial revolution, has led to a significant increase in the variety and number of products and services imposed on the consumer society created by capitalism. Users generally prefer or are forced to prefer products and services other than their basic needs, not because they need them, but in order to have fake status items designed by companies that shape the future, and to comply with temporary fashions and trends. With marketing strategies, products that already exist are adopted by users, and products that do not exist are shaped with science fiction elements and encode the future vision and products in our subconscious.

Having a say in the future of the world may become a responsibility that society, not companies or specific individuals, should undertake. Because every individual, directly or indirectly, is constantly shaping the present and the future with his/her thoughts and actions. Industrial designers have the potential to shape the future with every product or idea they design to exist in the future. Findeli [1] states that the designer involved in a design project should be aware and responsible for the fact that he/she is recreating the world in some way. According to Dunne and Raby, designers often do not go beyond aesthetic intervention in design, as they think that most problems have been solved [2]. However, major challenges such as overpopulation, water scarcity and climate change bring real problems that need to be solved directly and indirectly. Dunne and Raby state that the only way to overcome insurmountable challenges is to change our values, beliefs, attitudes and behaviours. Findeli [1] points out that the aim of future generations should be to design a sustainable and balanced world and the design curriculum should be changed in this direction.

Designers see people as obedient and predictable users and consumers [2]. In Findeli's [1] words, "a user is more than the existence of the designer's statistical needs and desires". Since we cannot make definite judgements about what the future will look like when we turn our gaze towards it, it becomes a problem

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how to start the design of concepts without analysing the user profile [3]. Speculative design can be critical in shaping the future at this point. "The speculative form of design develops imagination and aims to open new perspectives on what are sometimes called wicked problems, to create spaces for discussion about alternative ways of being, and to encourage people's imaginations to flow freely" [2]. Thus, it is aimed to make the society think and raise awareness about possible futures. In the same way, factors that may lead to undesirable futures can be recognised and discussed early on, or at least measures can be taken to limit them.

Since every design idea does not exist until the productisation process, it can be said that it is a notion of the future in terms of its structure. Celi and Formia [4] address this role of designers by saying that designers can establish a dialectic between the present and possible futures, grasp the patterns of the past and shape future ideas by matching them with future trends.

Products designed for today's problems and users may not meet the needs of the future by lagging behind the change until they reach the end user due to long research and development processes. According to Jonas, industrial design, as a profession that shapes the future, should use foresights to analyse the needs of society and make accurate determinations [5].

The starting point of the research question is to question the role of speculative design understanding in the development of designers' creative thinking skills and gaining future vision. It is thought that gaining these skills to industrial design students through playful methods in the design education process will play an important role in the development of future vision in terms of increasing creative self-confidence and gaining flexible thinking skills. Thus, it is aimed to provide solutions to help them overcome greater design challenges.

It is anticipated that this research will make significant contributions due to the limited literature on speculative design in the context of industrial design, limited awareness of the concept of speculative design in Turkey, and limited prospects for future studies in this area.

In the first part of the literature review, critical design and fictional design approaches are defined under two separate headings within the framework of speculative design. The third section analyses the current use of speculative design in design education globally. The fourth chapter defines the method proposed to be applied in the research process. In the second section, the proposed methodology developed for the solution of the research question is given. Finally, conclusions and discussions based on the studies are given in Chapter 4.

2. SPECULATIVE DESIGN

Wong and Khovanskaya [6] argue that the precursor of speculative design is Chindogu, the Japanese art of creating humorous, practical and everyday tools. A successful Chindogu product can provoke laughter as well as thought. For example, spaghetti cooler with a fan attached to a fork, a selfy stick or a flashlight with a large solar panel. However, Mitrović [3] argues that the foundation of speculative and critical design practice is radical Italian architecture and design practice. Dunne and Raby [2] identify the pioneers of speculative industrial design as Syd Mead and Luigi Colani, based on their work in the 1970s and 1980s. Colani's work for Canon cameras in the 1980s is said to have introduced a form of organic design that continues to influence camera design today. Syd Mead is a neo-futurist concept designer and industrial designer who did the concept design of many science fiction films and elements such as Blade Runner and Tron [7].

Technology companies are often interested in predicting the future. Sometimes they try to identify weak signals about new trends that may materialise. According to speculative design, this is a meaningless activity. These fictions often take the form of scenarios and are used to open up topics of discussion. They are therefore necessarily provocative, deliberately simplified and fictional. Its fictional nature leads audiences to suspend their disbelief and let their imagination wander, momentarily forgetting how they

are now and wondering how things could be [2]. The use of design as a speculative tool develops the imagination and creates spaces for discussion about alternative ways of being.

Speculative design is not only immersed in thinking about the future, but also provides a system for analysing, critiquing and rethinking contemporary technology. Auger divides this approach into two categories. The first is that current paradigms inform future developments of technology, i.e. the imagining of products and services in the near future. They are intended to serve as a kind of cultural litmus paper, testing potential products and services on an audience before they are actually introduced into the industry. Secondly, alternative presentations are design proposals that apply different ideologies or configurations to those who manage the product development process using contemporary technology [8].

As seen in the previous paragraphs, the concept of future is one of the basic building blocks of speculative design, which is often emphasised and even contributed to its name. There are many similar models describing futures, such as Auger's [8] model of alternative presences and speculative futures. A simple and effective definition is provided by Dunne and Raby [2] in their book Speculative Everything, where the notion of future is categorised and defined. Research has found that the foundation of this concept is based on an article by Hancock and Bezold in the field of health [9,10].

The cone of futures was shaped through five concepts. While one of these concepts represents the present, the other four are used to represent the uncertainty of the future. Stuart Candy [9] states that with the cone model, at any given point in time, there are multiple paths available and that we move forward along a path determined by an unknown combination of chance and design. In fact, the idea behind the cone is that just as the present is shaped by our past actions, our future is shaped as a result of our present actions [10]. In the cone model, the short-term future is defined as 1-3 years, the medium-term future as 5-20 years and the long-term future as 20-50 years. 50 years into the future is very difficult to predict and the boundaries of this cone extend to the medium term [10]. In order to better convey future time structures, the cones will be discussed individually.

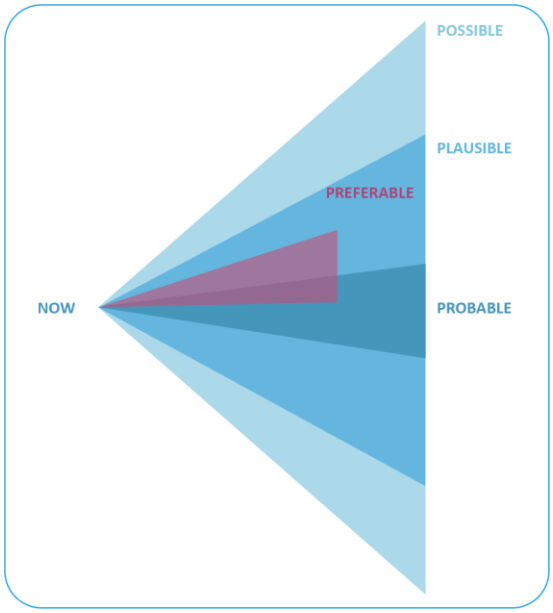

Figure 1. *Cone of Futures*

The first of these is the topic of possible futures. Dunne and Raby [2] state that it explains what will happen in the future unless there is an extreme upheaval such as financial crisis, ecological disaster, pandemic or war, and design education is oriented towards this area. The second cone is the logical futures cone. "This area is related to scenario planning and foresight and describes what could plausibly happen. The third cone is the cone of possible futures. It establishes links between today's world and the proposed world. Dunne and Raby believe that scenarios developed in speculative design should, firstly,

be scientifically possible, and secondly, there should be a path from where we are today to where we are in the scenario. Even if it is purely fictional, a plausible sequence of events leading to the situation in the scenario is necessary. Thus, the audience can relate the scenario to their own world and it helps for critical reflection. The last cone in the figure is the cone of preferable futures, which lies at the intersection of the cones of plausible and probable. Dunne and Raby [2] emphasise that determining the content of this cone is the main purpose of speculative design.

But for whom are preferable futures meant? Who decides on preferences? In response to these questions, it is argued that today, governments, industry or a minority group determine these preferences, while consumers play a limited role in making them. They argue that it is possible to create ecological futures that are more constructive, equitable and beneficial for society and more sustainable for our planet, and that in order to create these futures, people need to actively participate in these choices. Dunne and Raby suggest that in order to spread this awareness, designers can collaborate with other experts by constructing scenarios that define the future and utilising the participatory design method in the discussion processes over these scenarios.

In the literature research, it was observed that the authors defined speculative design from these two perspectives by addressing the fictional and critical aspects of speculative design [11-14]. We can say that speculative design is fictional in terms of imagining alternative present and futures, and critical in terms of discussing the acceptability of these fictional futures and their benefits for solving problems. For this reason, in this study, speculative design is intertwined with fictional design and critical design. In order to analyse speculative design in more detail, these two building blocks and their connections will be discussed in more detail.

2.1. Design Fiction

Tonkinwise [15] says that adding any qualifying prefix to the term design, such as speculative, critical, fictive, etc., should be seen as a mere tautology that gives design only an instrumental technical task. In other words, it does not take away from design, the existence of design itself is preserved. However, within the specific context of the prefix, it can add meanings and enrich the view of design.

According to Bruce Sterling, who first used the term design fiction in 2005, "design fiction is the deliberate use of diegetic (fictional, narrative) prototypes to suspend disbelief about change"[16]. Deliberate use means that fictions are made for a purpose. Diegetic prototype refers to a prototype presented in the story world. The formation of these prototypes, which is the method of design fiction, is defined as an iterative experimental process consisting of four stages, including idea generation, prototype construction, storytelling and discussions [17]. Hales [18] defines the purpose of design fiction as "creating a discursive space in which new cultural artefacts can emerge". It is similar to science fiction in terms of being discursive, but should not be confused. Science fiction aims to create fictional stories by using science and technology elements that have not yet been discovered or cannot be used in a certain future period. In order to keep these fictions alive, it uses mass media such as books, films, computer games and works of art. Embodying the aforementioned fiction products is not the purpose of science fiction. There is rhetorical use in both science fiction and design fiction, but unlike science fiction, the purpose of fiction in design is to transform the discursive into a phenomenon by designing it. In other words, design fiction designs products, prototypes that depict the changing world instead of just telling stories.

Celi and Formia [4] describe design fiction as the most effective way of implementing design processes within a wider audience. The reason for this is seen in the possibility of creating a discursive space. We can see that some of the elements we have seen in science fiction in the past are currently being realised or developed. This shows that science fiction elements can be the subject of fictional design and may not be just discourse. Sometimes these rhetorical narratives or fictional representations of projects carried out in secrecy are tried to be normalised through science fiction. Striking and horrifying examples of this can be found in the military field. For example, laser technology, which we have seen used as a weapon in some films, is now used in weapon systems or to change weather conditions [19], and holography, which

we are accustomed to from films, has been developed as a weapon to confuse the enemy's perception in battle scenarios in the field [20].

Presenting fictions within a cinematic framework can be effective in facilitating audience acceptance of ideas and can generate excitement among audiences about emerging technologies. "Fiction's lack of constraints provides a free space to put forward speculative fictions. It also places these speculations within a narrative that treats these ideas as already realised in a social context" [21]. Technological objects in cinema are artificial and normalised as practical and narrative objects that people actually use in daily life. For this reason, we can say that it is easier for the audience to adopt the products in fiction.

Speculative prototypes, which contain stories like objects of design fiction, may appear in an exhibition or museum in order to make people think and question the future. The purpose of these speculative works used as exhibition elements is generally not to be objects of daily use, but to make people think with the meaning and future fiction it carries and to shape the future by affecting their lives according to that future fiction.

It is a building block of speculative design in terms of design fiction, rhetoric and concretisation. We can say that it matures in the process of conceptual design in terms of its productisation intent. Conceptual design is a parallel field of speculation that uses hypothetical or fictional products with more productisation concerns to explore possible functional and/or technological futures. Industrial product design generally works through conceptual design [2]. Speculative design also uses conceptual design in its infrastructure. In order to explain the conceptual aspect of speculative design, it would be useful to talk about the distinction between the terms "ideal" and "real".

"Conceptual design deals with realism. Conceptual design is not notional because it has not yet been realised or is not waiting to be realised. The potential to use the language of design to question, provoke and inspire is the defining characteristic of conceptual design" [2]. Hans Vaihinger [22] states that "if something is conceptual, it is not only an idea, but also an ideal, and thinking is a space for experimenting with ideas and ideals". He says that the ideal is an intellectual structure that contradicts itself and reality and defines it as a practical fiction. "As philosopher Susan Neiman points out, ideals should not be measured in terms of whether they correspond to reality. Reality should be judged by whether it is based on ideals" [23]. Based on this judgement, the way ideals can change reality is to question reality through ideals. In this respect, speculative design judges whether reality is based on ideals and non-ideals. Thus, it aims to seek solutions to problems or to provide an alternative context to conventional products.

2.2. Critical Design

The term critical design was first used in Dunne's [24] Hertzian Tales and developed in Dunne and Raby's [25] Design Noir. In these sources, it is mentioned that Italian Radical Design was highly critical of social values and design ideologies in the 1970s and that critical design was built on this attitude. Malpass [26] states that critical design emerged from developments in the field of human-computer interaction and later interaction design, thus influencing traditional approaches to designing these interactions.

Lukens and DiSalvo [27] state that "In Dunne and Raby's view, design is more than a way of investigating and addressing the needs of customers. It is a way of asking difficult and often ignored questions about technology and culture". Dunne and Raby [2] state that critical design aims to question the way technology has entered our lives and to question the limitations it imposes on people through criticism and challenge. When criticism is mentioned, people think of negativity, but in the perspective of critical design, it is stated that criticism is not necessarily negative, but it can also be a gentle rejection of what is presented to society and a departure from norms [2]. Critical designs are proof that there can be different alternatives and at the same time emphasise the weaknesses in the current normal.

"In critical design, it is seen as a necessity that the user experiences dilemmas and needs interpretation. The aim is to mobilise the imagination and intelligence of the audience for the designer to convey the message" [26]. Thus, it is aimed to create assumptions and stimulate discussion. Critical design practice,

through the use of rhetoric, aims to make users imagine using the object in their daily lives. "It utilises practical functionality to achieve the primary goal of conveying a deliberate message strong enough to trigger debate" [28,29]. "For critical design practice to function as commentary or enquiry, its objects must be seen as industrial design" [28]. Looking at critical design examples as works of art will lead to a different discussion about the object other than analysing and criticising it as product design.

Industrial design processes also involve an innovative approach and therefore critical methods rather than normativity. The design problem, which is the starting point of the designs, reaches its final form by passing through critical filters. According to Dunne and Raby [2], "all good design is critical. Designers start by identifying the shortcomings in what they are redesigning and offer a better version."

Speculative design and critical design are referred to in some sources in an intricate dual structure. For this reason, they are referred to with the abbreviations SCD (Speculative Critical Design) or CSD (Critical Speculative Design), which are the initials of their English names [12,13]. So what is the relationship between critical design and speculative design? Malpass [26] explains the relationship between speculative design and critical design through an example by stating that "if speculative design focuses on science and the potential future applications of applied technology, critical design focuses on the current social, cultural and ethical implications of design objects and practice".

Tharp B.M. and Tharp S.M. [30] define speculative design and critical design as discursive in the sense that they can be a vehicle for active discourse, social debate and the expression of ideas that matter mainly. According to Foucault's philosophical view "discourses are closely linked to who controls communication, and the most powerful discourse defines what norms are to be applied in society" [31]. Johannessen [13] states that the aim of critical design and speculative design is not to produce solutions, as in discursive design practice, but to ask questions and encourage discourse.

2.3. Speculative Educational Activities

If we consider traditional design education through the cone of futures, we can see that it will fall into the field of possible futures. This is because traditional design education does not take into account extreme upheavals such as financial collapse, eco-disaster or war. However, it is seen that some educational institutions globally have managed to break out of this traditionalism and are willing to adapt innovative methods to their educational systems.

Future studies methods have long been used in many institutions and organisations as well as in some educational institutions. In the words of Masini [32], "Education on how to think about the future is of great importance for all members of society because of the need to look ahead". As an individual, our ability to make sense of and imagine the future becomes as important as our current knowledge. However, predicting the future without systematic methods may reduce the probability of accuracy of the prediction or cause us to get lost among alternative futures. For this reason, the need for methods that strengthen our systematic thinking is important. Design education is a discipline that needs this systematisation process due to its conceptual processes.

Design education can adopt a vision that aims to educate designers who can shape the world of the future instead of designers equipped with the skills to meet the needs and problems of today's world. In this section, the contents of SpeculativeEdu [33], which was created to collect the outputs of a project within the scope of new educational skills and practices for the 21st century, which was reached as a result of researching institutions and organisations that include speculative design in their curriculum, will be discussed.

SpeculativeEdu is defined as "an educational project funded by Erasmus+, the European Union's education, training, youth and sport programme, which aims to strengthen speculative design education by collecting and exchanging existing knowledge and experiences while developing new methods in the field of speculative design". The project was organised between 1 October 2018 and 30 September 2020 and included workshops, symposia, exhibitions and conferences. As a result of the work, a textbook and

open access online resources for students and practitioners were created. According to the data of this project, there are 35 institutions, programmes and initiatives worldwide that are engaged in educational activities in the field of speculative design, and the site allows for the addition of new activities. It is seen that educational activities on future studies are also included among these activities. According to the examination of the practitioners' declarations, it is seen that the activities have been or are being carried out in areas such as visual communication design, textile, service design, design thinking, interaction design, experimental design, interior architecture, critical design, graphic design and urban design, and do not directly cover a university that provides industrial design education.

2.4. Speculative Design Methods

Design methods are systematic operational tools used to make the cognitive processes in the design process more concrete [34]. Jerrard, Newport and Trueman [35] state that with technological developments and the spread of mass production, attention has shifted from form to the consideration of human needs, which requires a new look at design methods. Bayazit [36] states that the first scientific study on design methods was the Design Methods Conference organised by Jones and Thornley. The methods here were obtained by systematising the designers' own way of working and externalising it as a design method.

During the literature research, it has been observed that the methodological approaches of cinema, literature, science, ethics or art have been discussed in order to find inspiration while speculating through design, and it has been observed that the methods in these different fields have been mixed, adapted and brought to speculative design. It has been observed that speculative design is usually presented through examples and that there are a number of methodologies. In the continuation of this title, the "Thing From The Future" method, which is proposed to be used in the research methodology, will be mentioned.

Thing From The Future was published by Situation Lab in 2014 [37]. It is a card game with different variations that can be used both to gain creative flexibility and for a project. This game allows us to create variations or include our own words in the game. There are basically 10 basic variations. Here we will describe the standard, common and widely used variations, which differ slightly from each other. There are 4 types of card decks in the game, totalling 108 cards. The key terms on the cards are as follows;

Arc: Outlines the world in which the fiction is set and how far it is from the present. It consists of four types: growth, decline, discipline and transformation. Terrain: The thematic context or area where this object can be found in the future. Object: The focus of our imagination. It describes the cultural artefact that reflects visions of how the future is different from the present. Mood: gives an idea of what it might feel like to experience the object from the future.

It is stated that it is possible to make more than 3.7 million combinations with cards. For example, the variation in Figure-2 can be obtained by randomly selecting one card from each deck: Arc: Growth after 2 generations, Terrain: Pets, Object: Machine, Mood: Respect

Figure 2. *Thing From The Future: Print and Play Edition*

The standard variation can be played with a small group of 2-5 players. A card for each letter is randomly drawn from a deck of cards. The players then write and draw their ideas on the cards for 15 minutes on a table which is part of the game. Then everyone shares their future scenario with the group members. Players can choose their favourite future scenarios and give the cards used in that round to the winning player. Another type of gameplay can be with the participation of more players and the exchange of cards. Or players can discuss ideas out loud and transfer them to paper. In this way, a co-operative exchange of ideas takes place within the framework of fun. Another alternative is to have a guide, called a facilitator, select the cards and manage the process in a large group of players. Finally, players can play the game by writing their own words or design problems instead of choosing some cards.

3. METHOD SUGGESTION

Kelley T. and Kelley D. [38] define creative self-confidence as the belief in creating change in our environment and say that it can be strengthened like a muscle. In this section, a method proposal planned in line with the literature research will be presented in order to measure the effects of speculative design approach on creative self-confidence in industrial design education. The steps of the method are shown in figure-3.

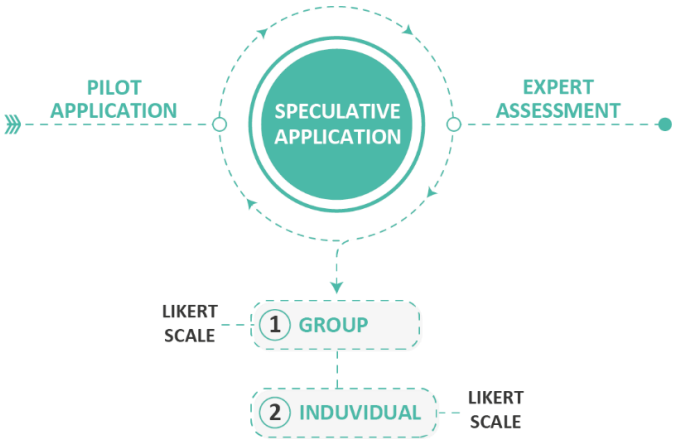

Figure 3. *Method Application Steps*

It is planned to carry out the application within the framework of the studio courses of the universities providing industrial design education in Turkey. The number of universities that can be included in the application may positively affect the quality of the research results, but it is recommended to limit the study to two universities that provide theoretical and practical education. In this way, the effects of two different educational approaches on students' creative skills can be compared. For the comparison of educational approaches, conducting the study on fourth year students may yield more rational results since they are more experienced. Due to the multidimensionality of creativity, it is planned to use more than one measurement method in the application.

An individual pilot application to be carried out on a small volunteer sample of 3-5 people before the application will allow to test the comprehensibility and application stages of the methods. For the pilot application, students can be selected according to their success status in the studio course. Success status ratings can be defined as unsuccessful, average success and successful. In order to meet the unsuccessful criterion, the student must have failed the studio course and be taking the course again, and in order to meet the successful criterion, the student must have the highest GPA among the students taking the studio course. Voluntary selection is considered to be an important criterion to prevent students' creative skills from being negatively affected due to reluctance.

The application proposal is defined in 2 stages and consists of group and individual applications. Participants should be asked to evaluate their creative self-confidence before the application with self-assessment scales. Making the same evaluation after the application will help to compare whether there is a change in the creative self-confidence of the students. It is recommended to get expert opinion while structuring the Likert scale.

Firstly, as explained in the previous section, the rules and functioning of the Thing From The Future game should be explained to the students. Approaching with a style that students will enjoy the game during the narration will help to increase their motivation, and motivation is considered important in creativity evaluations [39].

Stage-1: It is recommended that the first application be done with group variation. It is thought that group work will be beneficial for students to gain creative self-confidence. Participants should be asked to do the application individually in randomly formed groups and then share their future predictions out loud. During the application, blank papers are given to each participant to reflect their ideas freely and cards from each category are randomly distributed face down to form the word ATOM. After the distribution is completed, the cards are opened and the study is expected to be completed within 15 minutes. Afterwards, future predictions are shared aloud within the groups and then the papers are collected. It is expected that the students have now grasped the method and are ready to apply the method individually.

Stage-2: In the second stage, the method will be repeated individually. But this time, future predictions will not be shared out loud. After 15 minutes of application time, the papers are collected. After the second stage, Likert-type self-assessment scales are applied again and students' instantaneous creative self-confidence feelings can be compared with the initial assessment.

Finally, the studies are submitted to expert evaluation. It may be more meaningful to select the experts among the lecturers who teach the studio course, since they are familiar with the creative performances of the students. In the expert evaluation method, the field of experts and their opinions are important for the quality of the study [40]. It is suggested that Likert scales should be used again to ensure that expert opinions are measurable in line with individual or group outputs. Experts' approaches to the method can be determined by asking questions such as whether the method has the potential to increase creative skills, whether the experts would like to use the method in studio courses.

4. DISCUSSION AND CONCLUSION

Our rapidly changing world brings with it brand new design opportunities and in order to manage these opportunities, it is necessary to adapt new instruments to industrial design education. In the literature research, it was seen that there are a few universities that provide speculative design education, but only a few of these universities include product design education. In addition, there were a few industrial design studies conducted within the scope of future studies, but no academic study on the measurement of creativity with speculative design was found.

In this article, a method is proposed to investigate whether a speculative design method helps design students gain creative self-confidence. With the realisation of the application, it will provide data on whether the speculative design method, Thing From The Future method, affects the creative self-confidence of design students, on the comparison of theoretical and practical design education on creative thinking skills, on the comparison of individual and group studies on creative thinking skills. The aforementioned speculative design method can be used in both problem definition and solution generation stages. Thus, professional groups interested in design can overcome increasingly complex problem areas, strengthen their ideal future predictions and shape the future with their actions. The outputs of the study can even be transformed into prototypes that can be part of an enquiry and change in society.

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