Developments in Technology-Based Courses Contents of Interior Architecture Departments in Turkey

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Abstract. The introduction of information technologies in space design disciplines begins with the use of the Computer Aided Design concept in those disciplines. Since the first example of CAD tool which was launched in 1963, the ability to design using computers has been a method adopted by architecture and space design disciplines and transferred to the educational context. There were changes and transformations in this method due to the needs created by the developing building technologies. The CAD technology, has been adopted to the space design education in order to support the courses. The CAD which was created for challenging the difficulties in the practicing area and speeding up the process, also takes place among the traditional methods of space design in the Interior Architecture discipline. The possibilities provided by those digitally created spatial mediums, have led to a rotational improvement in both education and practice. In addition, the reflections of technological developments in the social context in last decade on many areas of life have led to the necessity of reorganizing the educational contents. Academic studies conducted in recent years, are designed to include the last technological developments in today’s educational contents and to reflect students’ interests and commitment to these technologies in direct proportion. Bearing this in mind, the objective of this study is to read out the reflection of the developments mentioned above on the Interior Architecture discipline in Turkey by monitoring the developments in the context of the need of updating the educational contents. In order to meet the social developments and today’s skills, space design education must follow the technological context in parallel. Based on these considerations, the studies of Turkey which were examined in this research have been conducted before could be explained as inadequate. In this context, to examine the curriculum of the Interior Architecture departments of Turkey and to monitor the updates mentioned before constitute the main focus of the study. CAD-based courses in the curriculum of the Interior Architecture departments were determined and the contents were examined. These analyses were achieved in the context of the methods, techniques and tools used in the courses, and after, the situation of the information-based courses were determined. It was concluded that these courses were transformed in direct proportion in line with the increasing needs in the educational context with the developing technology and updates should continue in the context of meeting today’s skills.

1. Introduction
Technological content of today’s information and media has a place among 21st century skills [1]. Web 2.0 tools, robotics, simulations, realities, cloud and such statements are the concepts of the era we belong to and people use them all intensively. The activities achieved by the technological tools in the view of these concepts today include the practical and educational processes of the engineering and
architecture fields. Similar with the most field, these fields and disciplines shape by the development of information technologies in a direct proportion. Information and computing technologies are welcomed to our lives with the emergence of computers. First computers having an origin dating back to the 1600’s were started to be used in the government and office spaces. Computers fitting into a room in those years were brought to life as the first personal computers in the mid 1970s with the use of integrated circuits [2]. Following this development, the computer-aided systems, which computers will operate together with, were started to be produced. Afterwards, towards the end of 1960’s, the ‘computer aided design’ concept had emerged which is used frequently in the practice and education of architecture and engineering [3]. Along with the emergence of the doctoral dissertation of Ivan Sutherland in Massachusetts Institute of Technology in 1963, the first computer aided design basics established [4]. Sutherland’s ‘Sketchpad’ accomplished the first graphical interface in computer system. This study has its place in history, being the first attempt of the interaction between human and computer by the start of making drawings with this system [5].

Computers, which were designed to serve for military areas at first, were developed by the digital laboratories and equipped with the graphical interface providing computer-aided drawing. They were used for producing mechanical components and developed in terms of capacity and quality in this context. They were inverted to programs such as CADAM, CATIA and so on and continued to be improved by the firms IBM and MAC [3].

There occurred divisions and the specializations in architecture discipline in 1910s mainly in the US as a result of the developments emerging from the ending of the First World War. These separations and differentiations exposed “Interior Design” and “Interior Architecture” concepts. Interior Architecture had its place as field of architecture discipline after the Second World War [7]. Considering the educational aspects of building design and engineering practice, Computer Aided Design has its place next to the traditional methods achieved with the sketch papers drawn with the tools such as rulers, compasses, French curves [8]. It means that, design is achieved when digital instruments imitate these activities in the traditional methods. The digital machines of the 1950s and 60s are the main tools of the daily life used by almost every person. It is possible to watch this from the contents of the architectural space design educations. This study is designed in the light of the following ideas:

a. Digital era is directly forming the educational contents and it must be adapted to these educational contents.

b. The accessibility and the frequency of usage of the communication and information technologies make the digital worlds obligatory in education.

In this research, it is aimed to examine the development of Computer Aided Design in the light of today’s situation of it. New generation technologies such as virtual/augmented reality, mixed realities or artificial intelligence products are being adapted to the world’s educational system and it is important to follow and put them into practice. In doing so, the methods of the departments of interior design and interior architecture of the world academies using the digital tools were examined. There are 63 universities having interior architecture departments in Turkey and the total number of the departments is 71. Every department’s content improvement meeting the needs of digital era was established such as communication and information technologies. These improvements were analyzed and it is seen that some schools have a converting content. With this study, the digitalization of Turkish interior architecture departments’ course contents are going to be watched in a general frame.

2. CAD Meets Interior Architecture
Interior architecture as a profession dating back a hundred years had its present form with being passed through many phases. It is known that some magazines and books published in 1990s America,
which are the first developments in this sense, lead the execution of interior design as a profession [9]. In line with the developments with these publications, the field of the profession has been identified over the years, and the name of the profession had changed to interior architecture or interior designer from interior decorator. Some organizations and institutions which have been founded until today such as AID, NSID, IDEC and CIDA had many works in terms of improving both the interior architecture profession and discipline. In this manner, interior architecture education developed globally.

The effects of the Modernism movement of the early 20th Century and the results of the Second World War played an important role in shaping the interior architecture discipline. The schools such as New York School of Decorative Arts (1877), Rhode Island School of Design (1877) and Pratt Institute in Brooklyn-New York (1901) in the US had given trainings of interior design approaches as educational content. After Bauhaus School of Design in Germany changed its attitude towards interior decoration to interior architecture, an American organization had adopted the same attitude with Bauhaus resolved the differences in itself and started to keep operating as ASID American Society of Interior Designers in 1961. In 1968, IDER Interior Design Educators Council was founded as the first step in educational content [10]. CIDA Council for Interior Design Accreditation as it is mentioned before, was founded as an organization named The Foundation for Interior Design Education Research before and started to operate in 1970 [11]. In 1968, with the study of Friedmann, the first definition of ‘interior designer’ was made. In 1973, FIDER had published the definition of interior designer, which was described by IDEC before in 1970 [11].

The periods that the interior design education, which was started with École des Beaux-Arts, changed with the Industrial Revolution, and continued to be formed by Bauhaus that was founded just before Second World War, coincides with the last years of Ottoman Empire. They are currently providing trainings as still existing institutions. The first one among them is Mimar Sinan University of Fine Arts formerly the Academy of Fine Arts, and in an order, firstly Istanbul Technical University and after Yildiz Technical University and METU Middle East Technical University [12]. In this meaning, the former institution of interior architecture education is Mimar Sinan University of Fine Arts. The university had adopted the ideas of Paris and Florence Ecoles, which their attitudes were dominant in art. After the establishing of the decoration class in 1923, in 1930 the first department, which will be the first step for the interior architecture in future, was founded. Besides, in 1957, the Academy of Applied-Fine Arts having the similar educational content with the Academy of Fine Arts but adopting the Bauhaus ideas had started to give interior architectural trainings [13].

Decorative Arts Department under Academy of Fine Arts had some sections like Poster and Photography, Fabric Design and Theatre. Furniture, Interior Architecture, Decorative Painting, Graphic Arts, Ceramic Arts and Textile Arts departments were under the Academy of Applied-Fine Arts [14]. All these content started to be updated by the policy of Ottomans which they begun to follow in the process of westernization. In this manner, by the agreements made with some countries such as Germany, France, Italy and Austria the most important movements were sending artists to train abroad, and calling artists, architects and academicians from abroad to give trainings to Turkish students [15]. Interior architecture having a past which people specialized on its fields such as furniture, decoration, fabrics and so on, has a content as designing the spatial volume, considering the user, overseeing the user’s physical and perceptive features, using colour, texture, material, lighting being the elements of design. Since Bauhaus, in the content of education which was minding design education firstly [16], there were technical drawing and architectural drafting subjects in it. The years 1961, 1971 and 1973 are important in terms of development of the educational contents of the Turkish interior architecture education.

Interior design profession and education continued to proceed with small number of students, developing contents and growing number of academicians. After Academy of Fine Arts and Academy
of Applied Fine Arts, in 1982 and 1987, interior architecture departments in Hacettepe University and following Bilkent University (the first Foundation University of Turkey) were founded in Ankara, the capital city. The Bologna Process, which had been started in 2001 and completed in 2010, was a process that interior architecture education had changes in it. This process was a reforming period, aiming to create a field of European Higher Education until 2010 [16], interior architecture profession was organized under the ‘Architecture and Building’ field. Besides, the departments had changes in the context of the faculties that they belong under [17]. The number of the departments of interior architecture within the universities of the state and foundations reached to 71 today [18].

Interior architecture made a lot of progress from the time it started with decorating and ornamenting until 1980s and become an advanced technical and specialized field [19]. Academicians kept the contents up-to-date by following the developments of technology and professional necessities.

Catching the current affairs and following the latest technologies, in the context of renewing the content of interior architecture education, the computers had a crucial role on development and expansion of interior architecture industry [20]. The beginning of the 1980s was a process to get used to CAD and drafting. The high prices of computers were a secondary issue near the possibilities of CAD, which offered 3D modeling and was very successful to achieve the problems of design process [20]. Firstly, by the uses of the firms, which started to design with computers, the AutoCAD program started to spread rapidly.

There are periods of accreditation and standards in interior architecture process after the Second World War. According to this, in order to equalize the definition of interior architecture and interior architect, the profession subjects to some criteria. They are ECIA European Council of Interior Architects in Europe, CIDA Council for Interior Design Accreditation in the US (the old FIDER), and NQF-HETR National Qualifications Framework for Higher Education in Turkey. The standards framework of Turkey was developed for structuring the course contents and application, and the curriculum of departments are organized subjected to the NQF-HETR.

In this meaning, the departments started to be founded from 1980s, should meet the degrees and proficiency necessities of this Standard, which was built up towards the Bologna process in 2010. Accordingly, considering the competences of the Bachelors degree in profession and academy, meeting the needs of Communication and Social Competence, the computer-based courses are organized under the title of informatics and communication technologies with at least a minimum level of European Computer Driving License Advanced Level software knowledge [21].

3. Results and discussion
First, the number of the departments increased in one year from 2019 to 2020 with 5 more universities having interior architecture/interior architecture and environmental design departments. The total number of the universities reached 63, and the departments reached 71. There are 16 foundation universities and 45 state universities having these departments.

The number of interior architecture departments is 30; 10 departments are organized under the state universities. Some of them are giving courses in English language. Those in English departments divide in two: having only in English and both Turkish and English. There are universities having interior architecture departments giving courses in both languages: Beykent University and Nişantaşı University in Istanbul.

The number of the department of interior architecture and environmental design is 41; 8 departments are located in the state universities’ structure. There are 12 departments teaching in English among total. Altındağ, İşık, Kültür, Medipol and Selçuk Universities are having the both languages within their curriculum. There is additional alternative as evening education in Turkey. Two
of the universities mentioned above offer this alternative besides the standard formal education and they are both under the state universities.

In today’s Turkey, Computer Aided Design courses are the common point of all interior architecture departments, in terms of ICT based contents. The used method of the courses is AutoCAD, which is used as a worldwide program in this area for decades. In Turkey, almost all the universities have courses to teach two-dimensional technical drawing in digital environments use AutoCAD software. Most of the departments- about the 11 percent of the whole number, start to meet students with digital worlds in their first year. Commonly, the CAD courses starts from the second year of education, except for 16 universities having the course in the first year. After succeeding the CAD based courses, students can take courses three-dimensional designing with computers. The method used in those courses is the perception of three-dimensionality in digital spaces. The programs having three-dimensional approaches are used for experiencing the third dimension digitally, drafting by a spatial environment, modelling the conceptual proposal and previewing the final of the interior designing of any product before the application in real life. The products of the Autodesk Company, 3DsMax with VRAY and REVIT are the most common digital environments used for three-dimensional modelling and rendering. Google SketchUp and Lumion are the other preferable programs in three-dimensional world of interior designing among these departments. Rhinoceros with Grasshopper software is the other three-dimensional environment as CAD/CAM software that uses NURBS interface. Finally, Python is used by some departments as a coding environment. 90 percent of the departments use these three dimensional environments as a course content and about 25 percent of them organizes these courses in third year of education. There is considerable amount of elective courses that are having these three-dimensional environments as content.

Following these courses, with the growing of digital worlds interior architecture education in Turkey experience these developments. Some departments started to renovate the ICT or CAD based course contents using new generation technologies. Virtual or augmented reality and mixed reality concepts that have been adopted in the three-dimensional spatial mediums are the methods of new generation technologies. They can be seen in every part of life with the mobile phones, so that nobody can claim that none has any clue about those. Especially the young people use these technologies very efficiently as a part of their lives. Studies and the world counters of social media firms show that their capability of the new technology should immediately reflect to educational contents. In terms of these ideas, some of the interior architecture departments of Turkey started to achieve these goals to catch up with these rapid developments. Besides the two-dimensional and three-dimensional drawing, drafting and modelling programs mentioned above there is one more system, which is used by plenty of firms or universities. BIM Building Information Management and it helps in application areas about managing besides drawing and drafting. It gives solutions throughout a project. At every stage of producing an architectural space, BIM can be used for meeting the drawing, communication, management needs. This interface gives the designer the chance of simulating and checking the reality of the project in a virtual or augmented way [22].

In this study, it is aimed to see that the technology based courses developing in Turkey’s interior architecture departments. In this manner, the universities adopting the new technologies are the main focal point of the research. Allplan, MAYA, Archicad, Maxon Cinema 4D are the other preferable software of some departments in terms of using new technologies besides the traditional ones. The most notable software of the last decade BIM is the newest method used by those programs above as the contents of the courses in Turkey. They are all being given as elective courses.

Besides the traditional educational content, digital spatial environments are the backing methods in terms of students’ understanding the three-dimension. When these three-dimensional environments step in after any traditional method, it helps student’s perception of the product that they are in its
creation process [23]. It is obvious that, from the beginning of the production of these environments it was aimed to fasten and ease the process of drawing and application [3]. This study shows that Interior Architecture departments of Turkey use the CAD/CAM environments very frequently and AutoCAD software comes in the first place. The other helper software are 3DsMax and Google SketchUp as modelling in interior architecture. Considering the contents of those courses having these software in their course methods, it is obvious that the traditional ways of teaching the three-dimensional environments are used in these environments also. Such as the creation of basic geometric shapes on paper with pencil and ruler, transforms on a digital base, this time the digital base has its methods by the tools around the coordinate plane.

The curriculum in terms of digital design, Turkey has a pretty good situation catching the current digital design curriculums abroad. The remarkable design schools of Europe have the similar way to teach interior design while using the traditional methods. So as in Turkey, The Florence Institute (Interior Design) [24], Politecnico Di Milano (Interior and Spatial Design) [25], Parsons School of Design (Interior Design) [26] has interior design courses having AutoCAD, 3DsMax, Sketchup, and VRAY software are the most used programs. The three-dimensional modelling software such as Vectorworks and Cinema 4D are used in the Interior Architecture department of Rhode Island School of Design [27], similarly Çukurova University [28], Turkey.

Besides the new-traditional software above, VR and AR are the new generation interfaces to use in design. For design schools, they are generally adapted to the courses with BIM software, which includes simulations and so on. In Turkey, some departments having approximately 5 percentile part are having their own BIM contented courses or some other supported with the electives that provided by the architecture departments' electives under the same faculty. Istanbul Bilgi University [29], İstanbul Medipol University [30] and Bilkent University [31] are the three of them and use BIM as an architecture department course to provide data science and modelling in architectural design. Considering the courses abroad, the examples like the Interior Design BFA Programs of New York School of Design in America [32] and Politecnico Di Milano in Europe [33] are using the new generation interfaces VR and AR.

4. Conclusions
The world is going through a rapid technological development especially among digital environments. When these computational systems were born, there was a way that cannot be turned back any more. In every part of life, we see the digital- even fitting in hands environments with little gadgets, so that, the educational transformation is inevitable. The idea of the design process, which could be realized in the future with holograms in the work of McLain-Kark and Rawls in 1988, is becoming quite common today. When CAD was newly created, they believed that these environments will help designers to solve the creative process problems. With these computational systems, experimental phases could be lived such as deciding the colours and furniture of an interior. They believed that simulations would be taken to action to experience the product before its creation [20].

Looking at the present, the digital environments are being used with the same way in the predictions of McLain-Kark and Rawls. Besides the client-designer relations, educational transformation is also lived rapidly. Design schools abroad are using the software to ease and fasten the processes of every design issue and so as to Turkey. It is seemed that to catch up with the schools abroad having high placements in world’s educational rankings such as THE Times Higher Education or the QS World University Rankings, it will get some time with devoted studies. From now on, these digital instruments mentioned before are the inherent parts of the design process. These instruments can be the part of education as a supportive method to the traditional studio methods besides the only-CAD-based courses or the other electives. To meet the needs of 21st Century and catching the pupils living in an entirely digital world, these digital instruments should be used in other courses in the
curriculum of the departments in order to make fun of the traditions and be nourished from the digital ones.

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