

## PLANNING EDUCATION AND SUSTAINABLE DEVELOPMENT: STUDENTS' PERCEPTION AND KNOWLEDGE – A CASE FROM TURKEY

**Ebru Cubukcu and Gozde Eksioglu**

### **Abstract**

Sustainable development is one of the great challenges of 21st century for various disciplines including city and regional planning. Studies showed that city plans fail to promote sustainable development, design professionals have limited understanding of sustainability issues, and curriculums in design education schools do not put the necessary emphasis on sustainability concepts. However, no study has tested whether planning students' have a different perception and understanding of sustainable development than other students. Thus, this study aims to understand attitudes of planning students towards sustainable development and compare planning students' and other students' knowledge about sustainable development. Data were collected by means of questionnaires, which asked questions about perception and attitudes towards sustainable development, source of information to improve sustainability knowledge, and level of knowledge for general, legal and architectural aspects of sustainability. One hundred ten volunteers (79 planning students, 31 general students) participated in the study. Results showed that students thought that very little sustainable practice appears to be undertaken. Although, planning students thought that the sensitivity to sustainability determines an important percentage of their final grades in a studio project, they reported not using many of the sustainability principles in studios. In addition, planning students

reported that they improve their understanding of sustainable development via classes, scientific articles and books. On the other hand, other students reported that they rely on visual and written media to improve their understanding of sustainable development. Despite those differences in sources of information, results showed that, planning students' level of knowledge (for general, legal and architectural aspects of sustainability) was not different than that of other students. In conclusion, although this study has some methodological drawbacks it is important in highlighting the necessity for a better look to planning education.

### **Keywords:**

Sustainability; sustainable development; planning education; education; sustainable design.

### **Introduction**

Sustainable development is one of the great challenges of 21st century for various disciplines including architecture, landscape planning, and city and regional planning. When it was recognized that the values, attitudes, and tools that led the production of present built environment have been causing environmental depletion over the years (Salama, 2002), planners

have acknowledged the need for better understanding of sustainable development.

In 1987, the World Commission on Environment and Development (WCED) popularized the concept of sustainable development, and defined the concept as 'the development that meets the needs of present generation without compromising the ability of future generations to meet their own needs' (WCED, 1987). Over the past two decades, the concept, with emphasis on physical environment, has been addressed by researchers, educators and practitioners, who are specialized in city and regional planning. Yet, the fact about the failure of neighborhoods and cities in adopting sustainable development is undeniable.

It is theoretically possible for city plans to foster sustainable development. However, in practice, city plans fail to promote sustainable development (Berke & Conroy, 2002; Manta & Berke, 1998). Berke & Conroy (2002) compared two groups of 30 plans for applying sustainability principles. The plans that explicitly used the concept of sustainable development for plan preparation were assigned to one group and the plans that did not use this concept for plan preparation were assigned to another group. Six principles were defined as concepts of sustainable development; harmony with nature, livable built environments, place based economy, equity, polluters pay and responsible regionalism. Results showed that explicit inclusion of sustainability concept for plan preparation did not effect how extensively sustainability principles are used in actual plans.

Franz (1998) summarized the research on sustainable development to list a number of factors that may explain the lack of sustainable

development practice:

"In terms of architectural practice, Thomas et al. (1996) identify high cost, poor consumer demand, lack of community interest and government regulations, low interest and restricted knowledge as the main barriers to sustainable practice. Other writers highlight additional reasons including: the lack of integration of sustainable practices in the design process as a whole (Branch, 1993); and the lack of weight and rigor afforded to environmental factors, the lack of records of cases of sustainable practice, the lack of timely and relevant information, tools that have not been developed with design constraints in mind, insensitive designers, and lack of knowledge with sustainability issues as basic tenets (McDonald & Brown, 1995)." (Franz, 1998:453- 454).

Franz (1998) also conducted an interview with practicing architects and designers to identify why sustainable design practices are not common. Lack of incentives in the design studio, absence of a restricted public policy, lack of knowledge on the part of the designer, poor availability of information were some of the items that were pointed by the participants of that study. Similarly, Cotgrave and Alkhaddar (2006) argued that the nature and structure of higher education, academic indifference and approach to teaching and assessment, the curriculum, student backgrounds, and lack of communication between industry and academia are the main barriers preventing inclusion of environmental content in the curriculum. According to Hayles and Holdsworth (2008) educator's knowledge and time, students' interest, financial resources and crowded curriculum are the main barriers.

Acknowledging the importance of all possible barriers to sustainable practice, this study focuses on the 'lack of knowledge for sustainable development', because we believe

people's attitudes and behaviors towards sustainability could be altered and some of the barriers of sustainable development could be removed with better knowledge. For example, with better knowledge planners may influence decision makers to develop better government regulations which requires integration of sustainability principles into the whole design process.

One study investigated the professional architects' and designers' attitudes toward sustainability and found that the professionals' have limited understanding of sustainability issues (Franz, 1998). The lack of knowledge among design professionals could be attributable to the insufficiency of design education in encouraging students to engage with sustainable development issues. Considering the fact that today's design graduates are tomorrow's design professionals, it is necessary for design educators to ensure that design students are aware of sustainability issues before graduation. Academic community have been addressing sustainability issues in research for a long time, but do they integrate the notion of sustainability in teaching practice?

Salama (2002) investigated whether architectural programs are structured with a focus to meet the objectives of sustainable development. He analyzed the curriculum of eight architectural schools in Egypt, Ethiopia, Nigeria, Syria, and Turkey, in order to understand the status of courses related to the components of sustainability in African and Middle Eastern architectural schools. He found that;

*'the words sustainability, sustainable development, green design, ecological design, sustainable design practices did not appear at all in any of the course titles or course*

*descriptions of any school' (Salama, 2002:55).*

This finding remains the same when fourteen schools of architecture in eight Arab countries; including Bahrain, Egypt, Kingdom of Saudi Arabia, Kuwait, Lubanon, Oman, Syria, and United Arab Emirates, were investigated (Salama, 2005, 2007). Iball (2003) conducted a similar study on Schools of Architecture, Landscape Architecture, Planning and Surveying in United Kingdom and reported similar findings. All these findings pointed that curriculums in some architecture schools of Middle East, Africa and Europe do not put the necessary emphasis on sustainability concepts. Given the unsustainable situation of the current built environments throughout the world, there is no reason to think that the findings would be different in architectural, landscape planning, and city and regional planning schools of other countries in Middle East, Africa, Europe, Northern America or Asia.

In order to empower city and regional planners to create healthy and pleasant life for the citizens and for the ecological cycle, it is necessary to increase their level of environmental sustainability literacy during education, before they enter the profession. A number of studies have sought to explore a new way of teaching sustainability in various design programs (Hayles & Holdsworth, 2008; Douvlou, 2006; Salama, 2008; Cotgrave & Alkhaddar, 2006; Jucker 2002 ).

In brief, although studies provide empirical evidence that city plans fail to promote sustainable development (Berke & Conroy, 2002; Manta & Berke, 1998), design professionals have limited understanding of sustainability issues (Franz, 1998), curriculums in design

education schools do not put enough emphasis on sustainability concepts (Salama, 2002, 2005, 2007; Iball, 2003), there is no empirical study testing the level of planning students knowledge for sustainable development. Thus, this study aims compare planning students' and other students' level of knowledge for sustainable development and attitudes towards sustainability.

## Method

### Description of the Questionnaire

A questionnaire was developed (1) to investigate planning students' perception and attitudes towards sustainable development and (2) to compare planning students' and other students' source of information to improve sustainability knowledge, perception of sustainable development practice, level of knowledge for general, legal and architectural aspects of sustainable development.

For perception and attitudes towards sustainable development two questions were asked. First question asked students to rate how much sustainable development sensitivity influences final studio grades using a hundred-point scale. Second question focused on the sustainability principles used in design studio projects. Students were presented twelve items, then they were asked to pick the items they often use in their studio projects. Ten of these items were selected from the concepts discussed in the sustainability literature; (1) equity, (2) air quality, (3) solar gain, (4) orientation of building, (5) energy efficiency, (6) accessibility, (7) waste management, (8) quality of life, (9) resource preservation, and (10) harmony with nature, and two fake items were added to the list; (11) technology and (12)

amount of commercial activity, to challenge and deceive students' answers.

For the source of knowledge about sustainability, students were presented six sources; (1) classes, (2) visual media, (3) written press media (newspapers), (4) scientific articles, and (5) scientific books, (6) others (students were allowed to specify a different source than the ones given). Then they were asked to pick the sources they use to improve their understanding of sustainability.

For perception of sustainable development practice, students were asked to rate how much they think the current planning practice puts emphasis on sustainable development using a hundred point scale.

For the level of general knowledge about sustainability, students were asked to give true or false answers to eight statements related to existing pre-judgments. Half of these statements were true and the other half was wrong.

For the level of knowledge for legal aspects about sustainability, students were asked whether they have any information about a national environmental law (2872 Environmental Law).

For the level of knowledge for architectural aspects about sustainability, students were presented ten items and they were asked to pick the ones they think determines an architectural project's success on sustainability. Among ten items, half of them were selected from the related literature; (1) pollution rate, (2) energy use, (3) material use, (4) reuse of water, and (5) passive design, and the other half were fake ones; (1) view, (2) value, (3) size, (4)

modern style, and (5) technology, to challenge and deceive students' answers.

### Participants

One hundred ten volunteers participated in the study. Seventy nine of them (male = 41%, female = 59%; ages: mean = 21.85, SD = 1.96, minimum = 18, maximum = 28 years) were undergraduate planning students in the Department of City & Regional Planning at Dokuz Eylul University. Students were equally distributed among the classes (first, second, third and fourth year classes). Thirty one students (male= 58%, female= 42%; ages mean = 21.32, SD = 2.04, minimum = 17, maximum = 25 years) were studying in a department other than city and regional planning and also other design programs such as architecture and landscape planning. About 85% of those students were pursuing a university degree (first year = 32%, second year = 10%, third year = 19%, fourth year = 23%) in departments such as medicine and engineering. Only 13% of them were recent college graduates and a few of them (3%) were high school graduates.

City and Regional Planning students were informed about the study in the university cafeteria. Students from other departments were recruited from university dormitories and cafeterias. The volunteers who were not studying in the university but encountered in these areas were interviewed as well. Participants completed the survey in 5-7 minutes.

## Results

### Planning Students' Perception and Attitudes towards Sustainable Development

Results showed that sustainable development was considered by planning students to be

an important factor effecting their studio grades. However, the principles of sustainable development were reported to be underused in design studios.

The planning students' ratings about the effect of sustainability concern on studio grades showed that, sustainability principles were not perceived as the most important determinant of studio grades, but they had a sizable effect, which can not be ignored. On average, students' ratings varied between 30% to 40% (Table 1).

	Mean %	SD %	Min-Max
1st yr. n=20	38.4	26.3	4-100
2nd yr. n=20	42.5	30.8	5-100
3rd yr. n=20	29.2	24.6	5-80
4th yr. n=20	33.5	25.1	4-70
All Students n=79	36.0	26.8	0-100

Table1: The Mean Percentage of the Effect of Sustainability Principles on Studio Grades (Source: Authors).

Recall, planning students were asked about which of the ten sustainability items, and two fake items, they use in studio projects. Results showed that, most students cared to think about harmony with nature (77%), and resource preservation (68%) in design studios. However, less than half of the students reported the use of equity (28%), air quality (32%), solar gain (33%), orientation of building (40%), and energy efficiency (40%) in design studios. Interestingly, although technology was included in the list as a fake item (the literature review did not provide information about how technology can be integrated in sustainable development) about

half of the participants (46%) reported that they use technology during studio projects to foster sustainable development.

Sustainability Principles	% Participants
Amount of Commercial Activity (fake Item)	15.2
Equity	27.8
Air Quality	31
Solar Gain	32.9
Orientation of Building	40.5
Energy Efficiency	40.5
Technology (fake item)	45.6
Accessibility	53.2
Waste Management	57.0
Quality of Life	58.2
Resource Preservation	68.4
Harmony with Nature	77.2

Table 2: Percentage of participants reporting the use of each item (Source: Authors).

### Comparison of Planning Students' and Other Students' Sources of Information

Results showed that planning students and other students differed in the sources they used to improve their understanding of sustainable development (Figure 1). For planning students, the most preferred sources of information were classes (76%), scientific articles (35%) and scientific books (35%). On the other hand, for other students visual (42%) and written (35%) media were the most preferred sources of information. The difference between planning students' and other students' sources of information achieved statistical significance for classes ( $\chi^2 = 32.9$ ,  $df = 1$ ,  $p < 0.01$ ), scientific books ( $\chi^2 = 11.9$ ,  $df = 1$ ,  $p < 0.01$ ), scientific articles ( $\chi^2 = 5.5$ ,  $df = 1$ ,  $p$

$< 0.05$ ), and visual media ( $\chi^2 = 6.2$ ,  $df = 1$ ,  $p < 0.05$ ). When participants were asked to indicate other sources they used, about fifteen percent of planning students and other students reported using internet to improve their understanding of sustainable development.

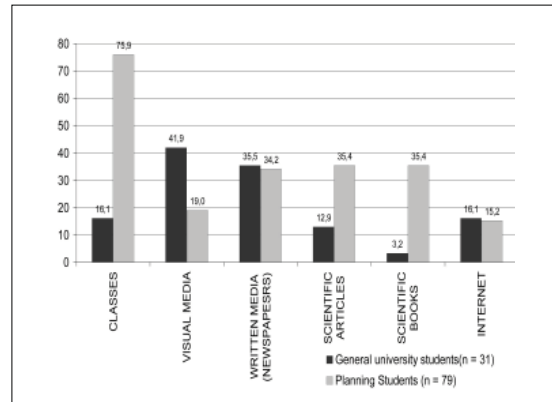


Figure 1: The Use of Various Sources of Information by Planning Students and Other Students (Source: Authors).

Given the high percentage of planning students who reported to gain sustainable development information from classes (76 %), we wonder if the curriculum of the investigated planning program is unique and puts more emphasis onto sustainable development issues than as suggested by Salama (2002, 2005, 2007) and Iball (2003). Following those studies the proportion of courses in which the words 'sustainability', 'sustainable development', 'green design', 'ecological design', 'sustainable design practices' appears were investigated. Results showed that the undergraduate program of Dokuz Eylul University City and Regional Planning Program is not quite different than the schools investigated by Salama and Iball (Table

3). Considering course titles, the program did not put much emphasis to sustainability related courses. A student has to take 71 courses (20 + 16 + 16 + 12 + 7) before graduation and only one compulsory course and two elective courses were devoted to sustainability issues. These findings may indicate that although there is not enough courses solely devoted to sustainable development issues, the concept is probably integrated and discussed in other courses in the curriculum.

	Total Course Number, Total Credits	Course Titles Including Sustainability Issues
1st year compulsory courses	20 courses, 62 credits	
2nd year compulsory courses	16 courses, 56 credits	City Ecology (2 credits)
3rd year compulsory courses	16 courses, 56 credits	
4th year compulsory courses	12 courses, 48 credits	
3rd and 4th year elective courses	39 courses, 78 credits*	Environmental Impact Analysis (2 credits) Environmental Consciousness (2 credits)
* A student has to choose 7 courses (14 credits) among the available elective courses.		

Table 3: Distribution of courses related to sustainability by years. ( Source: Authors).

### Comparison of Planning Students' and Other Students' Perception of Sustainable Development Practice,

The comparison of planning students' and other

students' ratings about the effect of sustainability sensitivity on current planning practice showed that, both groups of students thought that current planning practice does not put much emphasis on the issue. On average, planning students thought that current planning practice put 19% emphasis on sustainable development, while other students thought that they put about 29% emphasis on the issue.

### Comparison of Planning Students' and Other Students' Level of General Knowledge

When students were asked to give true or false answers to eight statements related to existing pre-judgments, planning students and other students were about equally successful. Planning students' average correct answers (mean = 5.47, SD = 1.29) were not statistically different than that of other students' (mean = 4.97, SD = 2.18) ( $t = 1.49$ ,  $df = 108$ ,  $p > 0.05$ ).

Figure 2 shows the percentage of participants giving correct answer to each statement. Note, half of the statements were true and the other half were wrong. True statements were indicated with (t), and wrong statements were indicated with (w) in the figure. For five statements, higher percentage of planning students gave correct answers compared to other students. However, for the remaining three statements, responses of other students outperformed the responses of planning students.

### Comparison of Planning Students' and Other Students' Level of Knowledge for Legal Aspects

Students were asked whether they have any information about a national environmental law (2872 Environmental Law). Results showed that both groups of students were not knowledgeable about the legal aspects. 90% of the general students and 72% of the planning

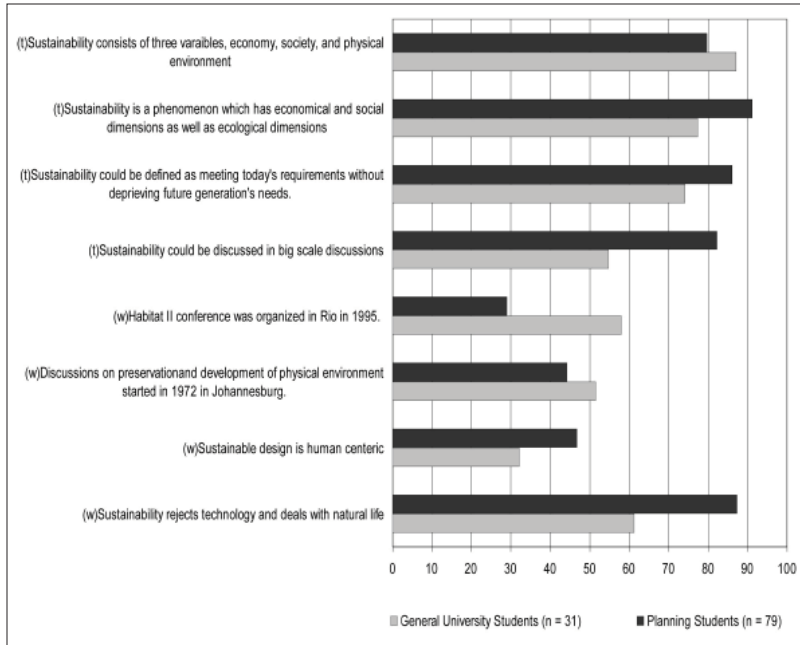


Figure 2: The percentage of participants giving correct answer to each statement (Source: Authors).

students reported that they do not have any information about the law.

### Comparison of Planning Students' and Other Students' Level of Knowledge for Architectural Aspects

Students were presented ten items and were asked to pick the ones they think determines an architectural project's success on sustainability. Literature suggests that a sustainable architectural project should concern for five items; (1) pollution rate, (2) energy use, (3) material use, (4) reuse of water, and (5) passive design to achieve sustainable development. Five fake items; (1) view, (2) value, (3) size, (4)

modern style, and (5) technology, were added to challenge and deceive students' answers. Planning students' average correct answers (mean = 6.35, SD = 1.62) were not statistically different than that of general students' (mean = 5.71, SD = 2.13) ( $t = 1.71$ ,  $df = 108$ ,  $p > 0.05$ ).

Figure 3 shows that, for six items (pollution rate, energy use, reuse of water, view, value, and technology) higher percentage of planning students correctly judge if the item is related to architectural project's success on sustainability or not. However, for the other three items (material use, passive design and size) other students outperformed planning students. Interestingly, although passive design is an

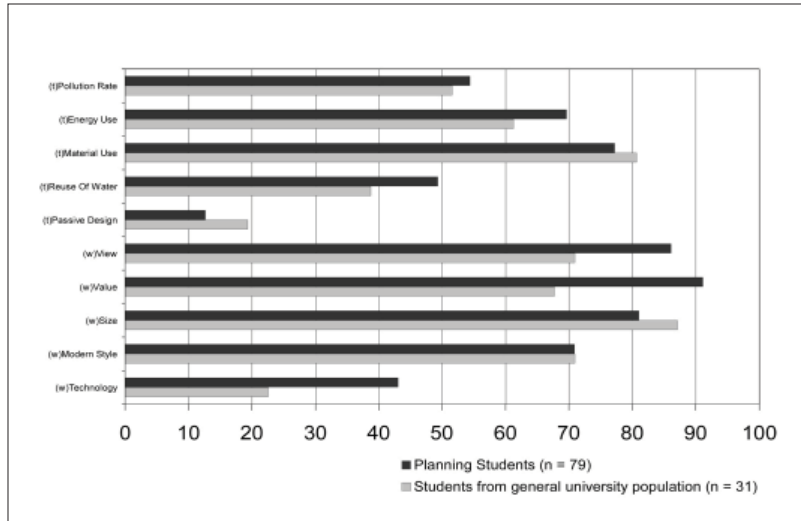


Figure 3: The percentage of participants correctly judging if the item is related to architectural sustainability or not (Source: Authors).

important concept that should be considered to achieve sustainable architecture, only 13% of planning students and 19% of other students correctly picked passive design as a determinant of success in achieving sustainable architecture.

## Conclusions

This study investigated planning students' perception and attitudes towards sustainable development and compared planning students' and other students' sources of information, perception of current planning practice's sensitivity to sustainable development, and level of knowledge for general, legal and architectural aspects of sustainable development.

Results showed that, the planning students thought that the sensitivity to sustainability determines an important percentage of their final grades in a studio project. Yet, they

reported not using many of the sustainability principles in studios. Similarly both planning students and other students acknowledged the fact that very little sustainable practice appears to be undertaken. As expected, sources of information to improve sustainability literacy differed for planning students and other students. Planning students generally learn sustainability from classes, scientific books and articles, and general students learn it from visual media and written press. One interesting result is that, although planning students claimed that the topic is discussed in classes, and they often read scientific articles and books about sustainability, their level of knowledge, measured by a questioner with true or false questions and open ended questions, was not different than that of other students. Both groups of students accepted that they are not informed about the specific national environmental law. Moreover, other students gave as much correct answer as

did planning students for the questions measuring the knowledge for general and architectural aspects of sustainable development.

As other empirical studies, this study has some methodological limitations about the questionnaire and the sample. Yet, it provides insights into the understanding of current planning students' level of knowledge for sustainable development and bring forth some interesting future research areas. There were four limitations related to the experimental set up and the characteristics of the subject group. First, the participants' level of knowledge for sustainability was measured with a set of questions. The questioner was developed by the authors of this study, since the literature did not provide such an example. However, the validity of the questioner to measure sustainability knowledge was not tested. Subsequent work may test the validity of this questioner or find better and broader measures of sustainability knowledge. For example future studies may focus on students' studio projects and evaluate the extent they focus on sustainable development. Second, this study was conducted in one planning school. However, the findings may be specific to the investigated planning school. A useful extension of this study may conduct similar investigations in other planning schools and analyze the correlations between sustainability emphasis in curriculum and students' knowledge for sustainable development. Third, the target population of this study was planning students in Western Turkey. Whether the results of the present study will apply to other design schools; such as architecture and landscape planning, and to other cultures remains to be seen. More work needs to be done to test the generalization of the results to other cultures and other professions. Fourth, this study was

focused on students. Future studies may focus on professionals.

As a concluding remark, the present study calls for a better look to planning education. Planning students' lack of knowledge for sustainable development may indicate that either the planning curriculum does not put enough emphasis to sustainable development or academics teaching planning do not integrate the concept in various courses and address this issue as much as it could be. Although discussing how planning education should be restructured to contribute to a more sustainable future is beyond the scope of this study, we believe it is, nonetheless, necessary to provide suggestions on how planning education could be changed to foster the creation of sustainable environments. Integrating a multidisciplinary approach; providing a broad base of knowledge considering the economic, environmental, social and cultural aspects of sustainability; encouraging students to understand the interrelationship between people and physical environment; increasing the number of courses that are devoted to understanding of sustainability issues; supporting and encouraging academic community to have a broader sustainability perspective and to become more involved in teaching about sustainable development; achieving accreditation between planning programs to enable future planners to create livable and sustainable environments are discussed by previous studies as ways of improving education towards a better understanding of sustainable development (Franz, 1998; Al-Hassan & Dudek, 2008; Salama, 2002; Salingaros & Masden, 2008; Haynes & Holdsworth, 2008; Jucker, 2002). Without a doubt, for sustainable development planners have to be talented and this talent has to come from knowledge.

## References

Al-Hassan, A.H. & Dudek, S.J.M. (2008). Promoting Sustainable Development in Arabia Through Initiating an Arab Architecture Accrediting Board, *CEBE Transactions*, 5 (1), pp. 71-89

Berke, P. R. & Manta-Conroy, M. (2000). Are We Planning for Sustainable Development?: An Evaluation of 30 Comprehensive Plans, *Journal of the American Planning Association*, 66 (1), pp. 21-33.

Branch, M. (1993). The State of Sustainability, *Progressive Architecture*, 74 (3), pp. 72-79.

Cotgrave, A. & Alkhaddar, R. (2006) "Greening the Curricula within Construction Programmes," *Journal for Education in the Built Environment*, 1, pp. 3-29.

Douvluou E. (2006). Effective Teaching and Learning: Integrating Problem-based Learning in the Teaching of Sustainable Design, *The Online Journal of CEBE*, 3 (2), pp.23-36.

Franz, J. M. (1998). Attitudes towards Sustainability and Their Implication for Education, Practice And Future Research, In *Proceedings Forum II: Architectural Education For The 3rd Millennium*, pp. 453-60.

Hayles, C. S. & Holdsworth, S. E. (2008). Curriculum Change for Sustainability, *Journal for Education in the Built Environment*, 3 (1), pp. 25-48.

Iball, H. (2003). Mastering Sustainability, In *Report of the Sustainability Special Interest Group (Architectural Education) on Behalf of the Centre for Education in the Built Environment*.

Jucker, R. (2002). Sustainability? Never heard of it!. *International Journal of Sustainability in Higher Education*, 3 (1), pp. 8-18.

Manta, M. & Berke, P. R. (1998). How are we doing? A Look at the Practice of Planning for Sustainable Development. *Carolina Planning*, 23(2), pp. 29-40.

McDonald, G. & Brown, L. (1995). Going Beyond Environmental Impact Assessment: Environmental

Input to Planning and Design, *Environmental Impact Assessment Review*, 15, pp. 483-495.

Salama, A. (2005). Skill-Based / Knowledge-Based Architectural Pedagogies: An Argument for Creating Humane Environments. In *Proceedings of 7th International Conference of the IAHH-International Association of Humane Habitat-Enlightening Learning Environments, International Association of Humane Habitat – IAHH, Compact Disc, Mumbai, India*.

Salama, A. (2007). An Exploratory Investigation into the Impact of International Paradigmatic Trends on Arab Architectural Education, *Global Built Environment Review*, 6 (2), pp. 31-43.

Salama, A. M. (2002). Environmental Knowledge and Paradigm Shifts: Sustainability and Architectural Pedagogy in Africa and the Middle East, *Architectural Education Today: Cross-Cultural Perspectives*. Comportments, Lausanne, Switzerland, pp. 51-59.

Salama, A.M. (2008). A Theory for Integrating Knowledge in Architectural Design Education, *ArchNet-IJAR: International Journal of Architectural Research*, 2 (1), pp.100-128.

Thomas, I., Okroglik, H. & Pollard, M. (1996). Surveying Environmental Considerations in Melbourne's Residential Development, *ASM*, 3 (4), pp 257-284.

World Comission on Environment and Development (1987). *Our Common Future*. Oxford University Press, Oxford, United Kingdom.

## Ebru Cubukcu

*Ebru Cubukcu, Ph.D. 2003, The Ohio State University, is an Assistant Professor of City and Regional Planning at Dokuz Eylul University, in Izmir, Turkey. She conducts research in the area of environmental perception, spatial cognition, virtual reality, post occupancy evaluation and design and planning education. Her research has appeared in environmental psychology and urban planning journals, including Environment*

and Behavior, Environment and Planning B: Planning and Design, Color Research and Application. She can be reached by email at [ebru.cubukcu@deu.edu.tr](mailto:ebru.cubukcu@deu.edu.tr).

---

### **Gözde Ekşioğlu**

Gözde Ekşioğlu, Bs. 2007 Dokuz Eylül University Department of City and Regional Planning, in Izmir Turkey. She is currently a research assistant in City and Regional Planning Department at Dokuz Eylül University and working on her master degree in the Master Program of Urban Design at the same university. Her research interests included sustainable development, basic design education, and environmental aesthetics. She can be reached by email at [gozde.eksioglu@deu.edu.tr](mailto:gozde.eksioglu@deu.edu.tr).