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Interdisciplinary New University: A New Model for Faculties of Arts and Sciences in Turkey

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Abstract

The concept of new university reduces the depth of disciplinary understanding at the undergraduate level. Instead, interdisciplinary understanding has been put forward, where room is provided for the broader development of student. Receiving training from multiple perspectives will provide students with the skills necessary in an era of present competitive society. People with critical thinking and decision making skills are needed in the complex modern world. This study presents a model for faculties of arts and sciences. Graduates of Arts and Sciences Faculties experience employment problems. This could be overcome through providing students with opportunities to study minor subjects. In most developed countries, higher education institutions appear to implement a model in which students take general courses in their freshman year. They tailor a program of their own with the mentorship of their supervisors.

Key Words

Interdisciplinary, Higher Education, Faculty of Arts and Sciences.

Modern university is thought to have arrived at its current state today through the influence of positivist paradigms. In positivist science, "in depth disciplinary knowledge" and "expertise" in a certain discipline are the fundamental principles. Gür (2003) asserts that this approach began in the Middle Ages and survived up to the 17th century, and were applied across Oxford and Cambridge Universities to Harvard College. There was only a "single truth" in this philosophy. Scholarship in the 21st century is characterized by innovations that question the disciplinary boundaries in the academy. Interdisciplinary programs broke through the divisions created in disciplinary programs (ASHE, 2009; UCLA, 2006; Ulusoy, 2007). The social and economic difficulties of modern society require a high quality work force. Higher education institutions in this context serve as a means for preparing individuals academically and socially. The National Science Foundation (2004) have indicated that they are aiming at building a well-educated and skilled workforce for cutting-edge interdisciplinary areas that are primed to drive economic growth in coming decades" (p. 4).

The American Association of Universities underlines the need for greater expectations for a growing student population. As Boix Mansilla notes (2008) "learners of the present and future must be agents of their own learning, critical inquirers, able to collaborate, able to apply higher order thinking skills to real life problems, to manage cultural complexity and to make meaningful connections across disciplines" (p. 31). The Teackle Foundation study of liberal arts colleges shows that, 99 per cent of the institutions are somewhat interdisciplinary (Boix Mansilla, 2008).

This paradigmatic change has influenced Turkish higher education in recent years. The process was initiated by Sabancı University (Sabancı Üniversitesi, 2011), which calls itself to be a "university

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with no departments", and was followed by Işık and Okan Universities. Since 2010, there has been a move toward a disciplinary approach, which has challenged the traditional department system. Gürsoy (2009) also notes several piloting universities, which started to initiate interdisciplinary programs. The Turkish Council of Higher Education implemented a pilot study at Ağrı İbrahim Çeçen University, Ardahan University, Artvin Çoruh University and Bayburt University (Ek Yerleştirme Haberler, 2010). In this system, students choose their departments not on a departmental basis but on a program basis. Students are given the opportunity to learn more about the programs in their freshmen years, a platform from which students can discover their skills and areas of interest in order to pursue their career. The need for such a structural change in Faculties of Arts and Sciences was also put forward at the meeting of deans of Faculties of Arts and Sciences in 2006 in Turkey (Fen Edebiyat Fakültesi Dekanlar Toplantısı, 2006). In parallel with this view, it was agreed to incorporate an interdisciplinary approach into the system so as to train successful candidates, who could be employed both nationally and internationally.

The purpose of this study is to present a new model for Faculties of Arts and Science as a response to the limited employment opportunities that these graduates face. This study has been inspired by the recent developments in the university concept in terms of interdisciplinary, major and minor areas in faculties over the last 20 years.

Interdisciplinary Approaches

Boix, Mansilla and Duraising (2007) define "interdisciplinary understanding as the capacity to integrate knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement" (p. 219). Similarly, Klein (1990) underlines the integrative nature of interdisciplinary education.

Parker (2002) notes that "the discipline is different to the subject - a subject is a knowledge base, whereas a discipline is a tribe, a culture, a guild. The discipline is a *culture* rather than a body of knowledge per se" (p. 374). Becher (1989) describes disciplines in terms of "tribes" with significant identities and "cultural attributes". He indicates that each discipline has its professional language with its territories (p. 22). Van Merriënboer (1997) notes that developing interdisciplinary understanding takes time since interdisciplinary thinking is a complex skill requiring certain sub skills. These discussions date back to the 1970s.

The typology developed by Biglan (1973) serves as one of the major sources in the scholarship of interdisciplinary education. His categories are as follows:

- Hard Pure Science (for example, physics)
- Hard Applied Science (for example, engineering)
- Soft Pure Science (for example, sociology)
- Soft Applied Science (for example, education)

In his literature summary on disciplinary differences, Becher (1994) observes that "the disciplines falling in the soft-pure quadrant in Biglan's categories have a limited relationship with the outside world" (p. 155). Kuhn (1962) emphasizes a similar interaction among the disciplines.

Interdisciplinary education was on the agenda in the 2000s and many attempts have been observed in universities to realize interdisciplinary understanding. A detailed literature review revealed that views can be categorized under two titles, that is, "disciplinary focused and interdisciplinary focused." Becher (1989), Shulman (1993), Braxton and Hargens (1996), Clark (1987, 1996, 2004), Cashin (1990), Klein (1990), Franklin and Teall (1995), Feller (2002), Eckel and Kezar (2003), Jacobsen, Hels, and McLaughlin, (2004), Wuff and Austin (2004), Newell (2007), Sa (2008) and Krometis, Clark, Gonzalez, and Leslie (2011) stressed the importance of interdisciplinary education. Similarly, Turner (2000) emphasized the importance of collaboration among faculty members from different disciplines.

Neumann, Parry, and Becher (2002) note that "some disciplines overlap categories (for example biology, has both hard/pure and soft/pure elements), and some disciplines contain "deviant" specialism (for example socio-metrics, as a hard/pure subfield within sociology which is predominantly soft/pure)" (p. 407). Neumann (2001) underlines the importance of interdisciplinary notion at universities. Donald (2002) indicates that courses in hard pure fields are structured with related concepts and principles. In his study aiming at identifying the differences in disciplines, Hativa and Marincovich, (1995) found those students' critical thinking skills in soft science disciplines develop more when compared to students in hard disciplines. Donald (2002) also puts forward similar ideas in his study entitled "Learning to Think: Disciplinary Perspectives".

Smart and Ethington (1995) also discuss the cross cutting categories between hard/soft and pure/app-

lied categories. Their study findings were categorized under three factors:

- 'knowledge acquisition' (the acquisition of multidisciplinary general knowledge),
- 'knowledge application' (the in-depth knowledge of a specific subject that prepares the student for a career), and
- 'knowledge integration' (the use of knowledge to think creatively).

Şimşek (1997) asserts that contemporary university aligns with the post positivist paradigm, where knowledge and truth are associated social constructs. In this respect, teaching, learning and research processes should be arranged in a way to train students in harmony with the current demands of society.

Helfand (2010) argues that some faculties are skeptical about implementing interdisciplinary programs. He believes that avoiding from interdisciplinary education is impossible because "life is interdisciplinary where there are no departments". Moreover, there are only a few studies which specifically focus on the interdisciplinary approach in Faculties of Arts and Sciences. Krometis et al. (2011) conducted a study documenting the experiences observed in an interdisciplinary course. Students found the exposure to new perspectives an exciting and worthwhile academic experience. Another study which was focused on interdisciplinary education was conducted by Pennee (2007). In her study, she projected her experiences as interdisciplinary program chair and found one of the most significant challenges was creating an interdisciplinary culture in higher education institutions.

In the book, "The Flight from the Arts and Sciences: Trends in Degrees Conferred", Turner and Bowen (1990) state that the number of single discipline fields has disappeared. Instead, interdisciplinary fields have emerged. Abbott (2001) also believes that disciplines will be "reshaped" in an era of multidisciplinary culture.

Haworth and Conrad (1997) indicate that a unique perspective should be incorporated into the programs. The following four components were found to be important in creating a unique perspective:

- diverse and engaged participants,
- participatory cultures,
- interactive teaching and learning
- adequate resources (pp. 32-34).

Haworth and Conrad stress the importance of involving students, academic staff and the administrators from different settings in order to support interdisciplinary thought. Brint, Turk, Proctor, Murphy, and Hanneman, (2009b) state that universities are expected to tailor their programs under the Faculty of Arts and Sciences. They also assert that special importance needs to be attached in "liberal arts" programs. Stark, Lowther, Benthley, and Martens, (1988) found that disciplines have a strong impact on an individuals' career.

In Turkey, Sabancı University is one of the first universities to implement interdisciplinary education. Deriving from his experiences, Ulusoy (2007) notes that special attention should be paid to interdisciplinary when tailoring the course syllabus. Academicians should be sensitive in a way to harmonize various disciplines in their course contents.

Stark et al. (1988) found in their study that course syllabuses serve as vehicles for training successful graduates. Therefore academicians are expected to tailor their syllabuses in accordance with the realities of the outer world. Brint and Cantwell also stress that (2011) future discussions should take into account differences among disciplinary categories. Being trained from multiple perspectives will provide the students with the necessary skills in an era of competitive society. A person, who has critical thinking and decision making skills, is needed in the complex modern world. Newell (2007) and Boix Mansilla, Miller, and Gardner, (2000) believe that interdisciplinary thinking spurs comprehensive thinking, which is very important in today's philosophy of education. Similarly, Newswander and Borego (2009) found that "when interdisciplinary programs facilitate engagement by supporting diversity, participation, connections and interactive teaching and learning, students report positive experiences" (p. 551).

Bok (2006) uses the term "under-achievement" to characterize the performance of American colleges and universities in undergraduate education. His study revealed that students' study hours and study behaviors vary with regards to their major. His study showed that analytical and critical thinking experiences also varied depending on the discipline of the students. Klein (2005) notes that interdisciplinary programs use "problem based" approach and this also serves as a facilitator to encourage critical thinking. Feller (2002) asserts, "where an interdisciplinary culture does not already permeate the institution, or where such culture is threatened, central administrative action is needed to nurture

heads who pursue collaborative research relationships that cross boundaries" (p. 113).

Spelt, Biemans, Tobi, Luning, and Mulder (2009) determine six learning process conditions that seemed to be important in enabling interdisciplinary thinking: "personal qualities, students' past experiences, curriculum, teacher, pedagogy, assessment" (p. 372). Their study showed that the following sub skills seemed to be important for interdisciplinary thinking:

- Knowledge Base: This sub skill consists of three sub skills; "knowledge of disciplines, knowledge of disciplinary paradigms, knowledge of interdisciplinary" (Boix Mansilla & Duraising, 2007; Eisen, Hall, Soon, & Zupko, 2009; Spelt et al., 2009, p. 373; Szostak, 2003).
- Higher-Order Skills and Communication Skills: Higher order skills indicate the necessary ability to search, identify, understand, critically appraise, connect and integrate theories and methods of different disciplines (Boix Mansilla & Duraising, 2007; Ivanitskaya, Clark, Montgomery, & Primeau, 2002; Klein, 1990; Newell, 2001; Manathunga, Lant, & Mellick, 2006; Spelt et al., 2009, p. 373; Woods, 2007).

The American Society for Higher Education (ASHE) published a report on interdisciplinary education. The Best Practices are summarized below:

Interdisciplinary Program: Davis (1995) asserts that as the degree of integration of multiple disciplines increases, the need for collaboration among the groups of faculty gets more. ASHE (2009) highlights the following characteristics of an interdisciplinary curriculum.

- Faculty
- Syllabi, Course Structure
- Constituent Disciplines
- Integration

Interdisciplinary inquiry enables students to engage in the freedom of inquiry. They are provided with opportunities to raise questions without concern for disciplinary boundaries (ASHE, 2009; Newell, 1990). The phrase "integrative learning" was used by Huber (2006) to stress the importance of harmonizing knowledge from many angles. An integrated program is offered to students studying at The Hutchings School of Liberal Studies at Sonoma State University. The interdisciplinary program includes courses from the humanities, social sciences and natural sciences. Students also attended interdisciplinary seminars in their freshmen year (ASHE, 2009; Sonoma State University, 2011).

Interdisciplinary Understanding and Practice: Brint, Turk, Proctor, and Murphy, (2009a) suggest that universities have been conservative especially in the fields of arts and sciences. "Institutions prioritize the structure of long standing disciplines in the arts and sciences, which are seen as integral to a liberal arts curriculum" (Brint et al., 2009b; Holley, 2009a). However, universities should be incorporated with the best interdisciplinary practices (Gumport & Snydman, 2002, p. 333). Boix Mansilla et al. (2000) argue that "interdisciplinary thought should involve two or more disciplines or established areas of expertise to produce a cognitive advancement" (p. 219).

Clark (1998), Eckel and Kezar (2003), Kogan (2000) and Holley (2009a) indicate that interdisciplinary practice needs to be incorporated with intense interaction as well as creating platforms for learning and research. Gumport and Snydman (2002) also note that universities cannot be isolated from knowledge production. Instead universities should serve as a bridge between disciplines and industry.

Holley (2009a) also discusses how the ways institutions practice interdisciplinary processes vary depending on the priorities of the institution. Campbell (2005) indicates that Massachusetts Institute of Technology (MIT) began an institutional transformational process by changing the physical and cultural structure of its campus. Duke University started the process by changing its tenure policies in alignment with the interdisciplinary notion. They also established a unit reporting to the vice president in a way that interdisciplinary understanding could spread across the campus (ASHE, 2009).

ASHE's report (2009) reveals that "purpose, content, structure of an interdisciplinary experience" could be arranged in "alignment with institutional, faculty and student components that best facilitate engagement across disciplinary boundaries" (p. 89). The best practices associated with interdisciplinary programs are summarized in the remaining parts of the study.

Dedicated Organizational and Physical Space: Universities should create spaces which cultivate a flexible environment that fosters an innovative interdisciplinary pedagogy. It should also be noted that interdisciplinary space is not only limited to the campus setting but extends to the external local environment. Pennsylvania State University in this sense created a setting where borders are destroyed in a way to concentrate interdisciplinary practice within the campus (Harris & Holey, 2008).

Newswander and Borego (2009) emphasize the importance of financial and administrative support for the effective dissemination of interdisciplinary understanding in the campus.

Creating adequate environments, allocating appropriate physical settings and finding faculty members who are interested in practicing interdisciplinary education appear to be the challenges experienced during the interdisciplinary transition process in one institution (American Association of Universities, 2005; Sa, 2007, 2008). Sa (2007) indicates that even though there may be limited space for interdisciplinary education, research teams could be formed to maintain interdisciplinary research at universities. Harris and Holley (2008) assert that universities should create an environment that sets a space for interdisciplinary research. Eckel and Kezar (2003) note that change regarding an interdisciplinary approach requires administrative support, collaborative leadership, flexible faculties and staff development and visible action (Holley, 2009b).

Student Centered Pedagogy: A hallmark of an interdisciplinary program in American colleges and universities has been an emphasis on student led interests. Students are allowed to tailor their own programs by working with the faculty advisory committee. At Gallatin School of Individualized Studies at New York University, for example, students are given the opportunity to consult any advisors across the university. Therefore the student is not only with the number of faculty members at his or her own faculty but also with those in other departments (ASHE, 2009).

Focus on Theme Based Learning: Students in interdisciplinary programs are active participants who tailor their own programs with a focus on certain themes. The thematic organization is implemented during the first years of the undergraduate education. Michigan State University is one example: Students' areas of concentration may focus on the following possible areas, which are community relations, environmental policy, human aging and public policy studies (ASHE, 2009). Assessment of the program is based on the following:

- *Student Portfolio:* The portfolio is the basis of students' development during the learning process. It acts as a mirror for the student and helps to keep track of his or her development. It also serves as an instrument after graduation (ASHE, 2009; Edgerton, Hutchings, & Quinlan, 1991).
- *Collaborative Learning Rather than Mastery of a Particular Content:* An interdisciplinary learning process enables students to develop skills that cultivate collaboration, team work, and reflection. Students could take active roles in organizing and participating seminars, conferences and workshops (Arizona State University, 2009).
- *Use of Independent Study, Internships and Experiential Learning:* The concept of interdisciplinary does not allow boundaries. Students are provided with opportunities for field work to integrate with society as much as possible (ASHE, 2009, pp. 97-98).

Goal of Preparing Students for a Complex, More Interdisciplinary Future

Interdisciplinary programs help to prepare students for a complex society. Arizona State University President Michael Crow (2010) initiated a new model for his university that has undergone a major program overhaul in the way to interdisciplinarity. Crow believes that "Universities should be useful to the local communities, as well as seeking solutions to the global challenges" (p. 5).

Model for the Restructuring of Faculties of Arts and Sciences from the Basis of an Interdisciplinary Approach

The literature review on current developments at higher education institutions shows that an interdisciplinary approach serves as a vehicle for training undergraduates from multiple perspectives. A person who has critical thinking and decision making skills is needed in complex modern life. This study presents a model for Faculties of Arts and Sciences. The proposed model is expected to serve as a means of easing employment problems experienced by Arts and Sciences students after graduation. In most developed countries, higher education institutions appear to implement a model in which students take general courses in their freshman years and continue an interdisciplinary program. In such a system, students are given the opportunity to tailor their own programs with the mentorship of their supervisors.

1. The proposed model accepts the current university entrance exam system in Turkey as it is. Students will choose their departments according to the scores they obtain from the centralized university entrance exam.
2. Students who are qualified to enter Faculties of Arts and Sciences will enroll on a General Education Program regardless of their discipline in their first year. They will choose their courses

under the supervision of their advisors. This general program is important for helping the student to form a strong base from which to realize their skills, interest areas and competencies as well as preparing them for working life after graduation. Therefore a wide spectrum of courses will equip students with various interdisciplinary knowledge and skills. That is why a committee in Arts and Sciences Faculties should be established to harmonize different disciplines under a coherent program.

Students will take courses in the following compulsory foundation knowledge and skills areas in their freshmen year:

General Culture: Writing, speaking skills, communication skills, team work, project development and management, interview techniques and such.

Technology and Practices: Fundamental computer skills, web design, office applications, fundamental laboratory practices and such.

Principles of Science and Fundamentals of Science: History of science, scientific research, field based fundamental research design, fundamental philosophy, logic and such.

Social and Cultural Areas: Art and history of art, literature, music, social and cultural problems in Turkey, globalization, new economic models, environment and problems, woman and child problems, business law, political change and transformation and such.

Entry Courses: Introduction to physics, introduction to mathematics, introduction to sociology and such.

Foreign Language: Fundamental English and such.

3. Students who successfully complete and qualified to continue to the sophomore year program, choose one of the three "field focused joint programs," which are categorized as:

- *Applied and Natural Sciences:* Physics, Chemistry, Biology, Mathematics and Statistics.
- *Social and Liberal Sciences*: Sociology, Psychology, Philosophy, History of Art, Turkish Language and Literature, History, Geography, Ottoman History, Arabic Language and Literature, Archeology, Anthropology and such.
- *Foreign Languages*: English Language and Literature, American Language and Literature, French Language and Literature, German Language and Literature.

Students who follow "field focused programs" in their sophomore years can choose elective courses from other disciplines in parallel with their interests and expectations.

The percentage distribution of the elective courses will be decided by the commissions of the faculty.

Students decide on their minor program that they will follow in their junior and senior years at the end of the sophomore year. The minor field should be chosen from another field, not the students' major. For example, students pursuing a major in Applied and Natural Sciences Program could choose a minor from the Social and Liberal Science Program.

Minimum credit weights in the minor program will be decided by the commission and the departments providing Bachelor's degree. Acceptance to a minor degree can be approved by the related department.

References/Kaynakça

Abbott, A. (2001). *The chaos of disciplines*. Chicago: The University of Chicago Press.

American Association of Universities. (2005). *Report of the interdisciplinarity task force*. Washington,

DC. www.aau.edu/WorkArea/showcontent.aspx?id=462 adresinden 3.09.2008 tarihinde edinilmiştir.

Arizona State University (ASU). (2009). *Women and gender studies*. Bachelor of Arts Program Description. http://newcollege.asu.edu/harcs/degrees/majors/womenstudies adresinden 3.10.2010 tarihinde edinilmiştir.

ASHE (2009). *ASHE Higher Education Report*. ASHE Higher Education Report Series, *35* (2). San Francisco, CA: Jossey Bass.

Becher, T. (1989). *Academic tribes and territories: Intellectual enquiry and the cultures of disciplines*. Bristol, PA: Society for Research into Higher Education & Open University Press.

Becher, T. (1994). The significance of disciplinary differences. *Studies in Higher Education*, *19* (2), 151-161.

Biglan, A. (1973). Relationships between subject matter characteristics and the structure and output of university departments. *Journal of Applied Psychology, 57* (3), 204 - 213.

Boix Mansilla, M. V. (2008). Integrative learning: Setting the stage for pedagogy of the contemporary. *Peer Review*, *10* (4), 31.

Boix Mansilla, M. V., & Duraising, E. D. (2007). Targeted assesssment of students' interdisciplinary work: An empirically grounded framework proposed. *The Journal of Higher Education*, *78* (2), 215-237.

Boix Mansilla, M. V., Miller, W. C., & Gardner, H. (2000). On disciplinary lenses and interdisciplinary work. In S. Wineburg, & P. Gorsman (Eds.), *Interdisciplinary curriculum: Challenges of implementation* (pp. 17-38). New York: Teachers College Press.

Bok, D. (2006). *Our underachieving colleges: A candid look at how much students learn and why they should be learning more.* Princeton and Oxford: Princeton University Press.

Braxton, J. M., & Hargens, L. L. (1996). Variation among academic disciplines: Analytical frameworks and research. In J. C. Smart (Ed.). *Higher education: Handbook of theory and practice* (pp. 1-46). New York: Agathon Press.

Brint, S., & Cantwell, A. M. (2011). *Academic disciplines and the undergraduate experience: Rethinking Bok's underachieving colleges thesis*. Center for Studies in Higher Education. Research and Occasional Paper Series, *6* (11).

Brint, S., Turk, B. L., Proctor, K., & Murphy, S. (2009a). Expanding the social frame of knowledge: Interdisciplinary, degree granting fields in American four year colleges and universities, 1975-2000. *Review of Higher Education*, *32* (2), 155-183.

Brint, S., Turk, B. L., Proctor, K., Murphy, S., & Hanneman, R. (2009b). The market model and the growth and decline of academic fileds in US colleges and universities, 1975-2000. http://www.higher-ed2000.ucr.edu./Publications/Brint%20et%20al%20(2009a)pdfnewcollege.asu.edu/harcs/degrees/majors/womenstudies adresinden 3.09.2009 tarihinde edinilmiştir.

Campbell, L. M. (2005). Overcoming obstacles to interdisciplinary research. *Conservation Biology*, *19*, 574–577.

Cashin, W. E. (1990) Students do rate different academic fields differently. In M. Theall & J. Franklin (Eds.), *Student ratings of instruction: Issues for improving practice* (pp. 113-121). San Francisco: Jossey-Bass.

Clark, B. (1987). *The academic life: Small worlds, different worlds*. Princeton: Carnegie Foundation for the Advancement of Teaching

Clark, B. (1996). Substantive growth and innovative organization: New categories for higher education research. *Higher Education*, *32* (4), 417–430.

Clark, B. (1998). *Creating entrepreneurial universities: Organizational pathways of transformation.* Oxford: Pergamon-Elsevier.

Clark, B. (2004). *Sustaining change in universities: Continuities in case studies and concepts*. New York: Open University Press.

Crow, M. M. (2010).Toward institutional innovation in America's colleges and universities. *Trustteeship*, *May*, 1-5. Retrieved 3 September, 2011 from http://newamericanuniversity.asu.edu/docs/Trusteeship_Magazine_Toward_Institutional_Innovation.pdf

Davis, J. (1995). *Interdisciplinary courses and team teaching: New arrangemenets for learning.* Washington: American Council on Education, Oryx Press.

Donald, J. (2002). *Learning to think: Disciplinary perspectives*. San Francisco: Jossey-Bass.

Eckel, P., & Kezar, A. (2003). *Taking the reins: Institutional transformation in higher education*. Westport, CT: Praeger Pub.

Edgerton, R., Hutchings, P., & Quinlan, K. (1991). *The teaching portfolio: Capturing the scholarship in Teaching*. Washington D. C: American Association for Higher Education.

Eisen, A., Hall, A., Soon, L. T., & Zupko, J. (2009). Teaching water: Connecting across disciplines and into daily life to address complex societal issues. *College Teaching, 57* (2), 99-104.

Ek Yerleştirme Haberler. (2010). *Önce gir sonra bölümünü seç*. http://www.ekyerlestirme.com/haberler-ve-duyurular/772-once-gir-sonra-bolum-sec.html adresinden 8.11.2010 tarihinde edinilmiştir.

Feller, I. (2002). New organizations, old cultures: Strategy and implementation of interdisciplinary programs. *Research Evaluation*, *11*, 109–116.

Fen Edebiyat Fakültesi Dekanlar Toplantısı. (2006). *Fen-Edebiyat Fakültesi Dekanları toplantısı sonuç raporu*. http://fef.kocaeli.edu.tr/dekanlik/krel.doc adresinden 12.03.2011 tarihinde edinilmiştir.

Franklin, J., & Theall, M. (1995) The relationship of disciplinary differences and the value of class preparation time to student ratings of teaching. In N. Hativa & M. Marincovich (Eds), *Disciplinary differences in teaching and learning: Implications for practice* (pp. 41–48). San Francisco: Jossey-Bass.

Gumport, P., & Snydman, S. (2002). The formal organization of knowledge: An analysis of academic structure. *Journal of Higher Education*, *73* (3), 375-408.

Gür, T. M. (2003). Araştırma ve eğitimde disiplinlerarasılık. O. N. Babüroğlu (Ed.), *Eğitimin geleceği. Üniversitelerin ve eğitimin değişen paradigması* içinde (s. 181-211). Sabancı Üniversitesi: İstanbul.

Gürsoy, S. (2009). *YÖK'ten bölümsüz üniversitelere uyarı.* Sabah Gazetesi, 29 Nisan. 2009. http://www.sabah.com.tr/Yazarlar/gursoy/2009/04/29/YoK_ten_bolumsuz_universitelere_uyari adresinden 7.12.2010 tarihinde edinilmiştir.

Harris, M. & Holley, K. (2008). Constructing the interdisciplinary ivory tower: The planning of interdisciplinary spaces on university campuses. *Planning for Higher Education*, *36* (3), 34-43.

Hativa, N., & Marincovich, M. (Eds.). (1995). *Disciplinary differences in teaching and learning: Implications for practice*. *New directions for teaching and learning.* San Francisco: Jossey-Bass Inc.

Haworth, J. G., & Conrad, C. E. (1997). *Emblems of quality in higher education: Developing and sustaining high quality programs.* Boston: Ally and Bacon.

Helfand, D. J. (2010). What are the benefits of interdisciplinary education? *Erudito, February.* Retrieved 5 October, 2011 from http://eruditojournal.org/?page_id=163.

Holley, K. (2009a). Interdisciplinary strategies as tranformative change in higher education. *Innovative Higher Education*, *34*, 331-344.

Holley, K. (2009b). *Understanding interdisciplinary challenges and opportunities in higher education.* ASHE Higher Education Report Series, *35* (2). San Francisco, CA: Jossey Bass.

Huber, M. (2006). Disciplines, pedagogy, and inquiry based learning about teaching. In C. Kreber (Ed.), *Exploring research based teaching* (pp. 69-77). San Francisco: Jossey Bass.

Ivanitskaya, L., Clark, D., Montgomery, G., & Primeau, R. (2002). Interdisciplinary learning: Process and outcomes. *Innovative Higher Education, 27* (2), 95-111.

Jacobsen, C. H., Hels, T., & McLaughlin, W. J. (2004). Barriers and facilitators to integration among scientists in transdisciplinary landscape analyses: A cross country comparison. *Forest Policy and Economics*, *6*, 15-30.

Klein, J. T. (1990). *Interdisciplinarity: History, theory, and practice*. Detroit, MI: Wayne State University Press.

Klein, J. T. (2005). The discourse on transdisciplinarity: An expanding global field. In J. T. Klein, W. Gorssenbacher-Mansuy, R. Haberli, A. Bill, R. W. Scholz, & M. Welti (Eds.), *Transdisciplinarity: Joint problem solving among science, technology, and society-an effective way for managing complexity* (pp. 35-44). Basel, Switzerland: Birkhause Verlag.

Kogan, M. (2000*). Transforming higher education: A comparative study*. London: Kingsley.

Krometis, L. H., Clark, E. P., Gonzalez, V., & Leslie, M. E. (2011). The 'death' of disciplines: Development of a team-taught course to provide an interdisciplinary perspective for first-year students. *College Teaching, 59* (2), 73-78.

Kuhn, T. S. (1962). *The structure of scientific revolutions*. Chicago: University of Chicago Press.

Manathunga, C., Lant, P., & Mellick, G. (2006). Imagining an interdisciplinary doctoral pedagogy. *Teaching in Higher Education*, *11* (3), 365-379.

National Science Foundation (NSF). (2004). *Interdisciplinary training for undergraduates in biological and mathematical sciences: Program solicitation*. http://web.mit.edu/newsoffice/2005/bcs-dec2.html adresinden 3.10.2010 tarihinde edinilmiştir.

Neumann, R. (2001). Disciplinary differences and university teaching, *Studies in Higher Education*, *26*, 135- 146.

Neumann, R., Parry, S., & Becher, T. (2002). Teaching and learning in their disciplinary context. *Studies in Higher Education* 27, 405-417.

Newell, W. (1990). Interdisciplinary curriculum development. *Issues in Integrative Studie*s, *8*, 69-86.

Newell, W. (2001). A theory of interdisciplinary studies. *Issues in Integrative Studies*, *19*, 1-15.

Newell, W. H. (2007). Decision making in interdisciplinary studies. In G. Morçöl (Ed.), *Handbook of decision making* (pp. 245-265). New York, NY: Marcel Dekker

Newswander, L. K., & Borrego, M. (2009). Engagement in two interdisciplinary graduate programs. *Higher Education*, *58*, 551-562.

Parker, J. (2002). A New disiplinarity: communities of knowledge, learning and practice. *Teaching in Higher Education, 7* (4), 373-386.

Pennee, D. P. (2007). Between cultures: Using curriculum assessment to develop and deliver the integrated core of an arts and sciences program. *New Directions for Teaching and Learning, 112*, 59-67.

Sa, C. (2007). Planning for interdisciplinary research. *Planning for Higher Education, 35* (2), 18-28.

Sa, C. (2008). Interdisciplinary strategies in U.S. research universities. *Higher Education, 55* (5), 537-552.

Sabancı Üniversitesi (2011). *Temel geliştirme programı*. http: http://www.sabanciuniv.edu/tr/?ogrenim/temel_gelistirme/temel_gelistirme_kapak/temel_gelistirme_kapak.html adresinden 10.01.2011 tarihinde edinilmiştir.

Shulman, L.S. (1993) Teaching as community property: putting an end to pedagogical solitude. *Change*, *25* (6), 6–7.

Smart, J., & Ethington, C. (1995) Disciplinary and institutional differences in undergraduate education goals. *New Directions for Teaching and Learning*, *64*, 49-57.

Sonoma State University (2011). *BA degree in liberal arts*. http://www.sonoma.edu/ar/admissions/pdf/hutchins.pdf adresinden 10.02.2011 tarihinde edinilmiştir.

Spelt, J. H. E., Biemans, H. J. A., Tobi, H., Luning, P. A. & Mulder, M. (2009). Teaching and learning in interdisciplinary higher education: A systematic review. *Educational Psychology Review, 21* (4), 365-378.

Stark, J. S., Lowther, M. A., Benthley, R. J., & Martens, G. G. (1988) Disciplinary differences in course planning. *The Review of Higher Education*, *13* (2),141–165.

Szostak, R. (2003). Classifying natural and social scientific theories. *Current Sociology*, *51* (1), 27-49.

Şimşek, H. (1997). *21. yüzyıl eşiğinde paradigmalar savaşı ve kaostaki Türkiye*. İstanbul: Sistem Yayıncılık.

Turner, S. (2000). What are disciplines? And how is interdisciplinarity different? In P. Weingart & N. Stehr (Eds.), *Practising interdisciplinarity* (pp. 46–65). Toronto: University of Toronto Press.

Turner, S. E., & Bowen, W. G. (1990). The flight from the arts and sciences: Trends in degrees conferred. *Science*, *250* (4980), 517-521.

UCLA. (2006). *UCLA's institutional proposal to WASC*. Retrieved 20 March, 2011 from http://www.wasc.ucla.edu/proposal.shtml.

Ulusoy, G. (2007). Disiplinlerarası araştırma ve eğitim. C. C. Aktan (Ed.), *Değişim çağında yüksek öğretim: Global trendler–paradigmal yönelimler* içinde (s. 389-398). İzmir: Yasar Universitesi.

Van Merriënboer, J. J. G. (1997). *Training complex cognitive skills: A four- component instructional design model for technical training.* Englewood Cliffs: Educational Technology.

Woods, C. (2007). Researching and develoing interdisciplinary teaching: Towards a conceptual framework for classroom communication. *Higher Education, 54* (6), 853-866.

Wuff, D. H., & Austin, A. E (Eds.). (2004). *Paths to the professoriate: Strategies for enriching the preparation of future faculty.* New York: Jossey-Bass.