Students' 99 Suggestions about Technology Integration in Higher Education

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Abstract: This study examined the university students' expectations about technology integration in higher education. Data were collected from 867 students of the Middle East Technical University (METU), Turkey during the 2006-2007 fall semester. Content analysis of the students' responses to the open-ended question revealed 99 suggestions about the technology integration in university education. These suggestions generally focused on the use of the Internet to reach the course materials, audio and video recording of courses, tools to communicate with instructors, and reaching digital library resources. Moreover, they stated that the technological infrastructures of classrooms should be improved, different educational technologies should be used effectively in courses, and professors should be trained on how to use educational technologies.

Introduction

If modern campuses are accepted as necessary institutions for information age societies, some essential components which are expressed by Langenberg and Spencer (2001) must be considered. Some of them are strong network infrastructure, institutional information, institutional e-work applications, course management system, collaboration tools, research resources, e-administration tools and servers.

When we look at the examples of modern campuses and universities which have integrated technology successfully, it is observed that these universities generally made strategy plan to accomplish their missions. For example, in Purdue University strategy plan, technology integration in education and instruction was mentioned as the main strategy. The strategy mentioned as to make students' learning easy by presenting innovative educational

technologies and technology integration into the courses was supported in the Information Technology Strategy Plan (Purdue University Strategic Plan for 2001–2006, 2002; Information Technology Strategic Plan, 2002). In addition, Ohio State University was a leader and innovative institution in supplying information technology infrastructure, service and supportive facilities in the education and research processes (Information Technology Strategic Plan, 2002). Mission of the Middle East Technical University (METU) also includes technology integration into the courses in order to increase the quality of university education (Strategy Plan for 2005-2010, 2005).

In the strategy plans of the universities which are prepared to keep up with the technological developments, to become a modern campus and to improve the university education, students' expectations and demands are vital. Thus, acquiring the technology integration suggestions according to students' perspectives may serve positively in order to make necessary investments on educational technologies. Purpose of this study is to obtain students' suggestions about technology integration in university for a better education.

Method

Participants
The sample of this study was 1282 students (639 males and 643 females) of the METU, Ankara Turkey in 2006-2007 fall semester. 867 of them responded our questionnaire.

Instruments
Data was collected by a questionnaire which was prepared by the researchers. Students filled them by the permission of course instructors. It consists of three sections. First section includes 5 demographic questions and second section consists of 7 close-ended questions about the technology use in education from students' point of view. Third section covers two open-ended questions which are about the deficiency of instructional technology use in the university and suggestions about technology integration which makes the university education privileged. 867 students answered the last open-ended question and in this article content analysis of the last question will be presented. Content analysis of these answers revealed 99 suggestions about technology integration for a modern campus.

Results

According to the content analysis of the students' responses, 99 suggestions for technology integration in higher education were revealed. According to the frequencies in a descending manner, these suggestions are listed. These are;
1. Lecture notes should be available online
2. Video and audio recordings of the lessons should be done and these materials should be easily accessible.
3. Elective courses should be given online
4. Technological infrastructure of classrooms should be provided/advanced
5. Various technologies should be used more and efficiently in the lessons.
6. Academic staff should be trained and informed about using technology in the lessons.
7. Simulations should be used in the lessons
8. Online library opportunities should be enhanced.
9. There should be online access to academic staff.
10. A cooperative working platform should be constructed with other universities. Online discussion environments should be formed and it should be possible to take online courses from other universities.
11. Laboratory facilities should be enhanced and the equipments should be updated.
12. Current technologies should be followed and they should be used in the lessons.
13. Technologies that enhance visualization of the content should be used.
14. Use of the NetClass (The LMS that is used in METU) should become a compulsory for the academic staff.
15. Video should be used in the lessons.
16. Internet should be used effectively, and its use should be encouraged.
17. The number of the computer laboratories should be increased.
18. The theoretical information should be improved with the applied information.
19. Computer laboratories should be upgraded.
20. Computer-aided instruction should be implemented.

21. The number of the computers should be increased.
22. Wireless internet connection should be widespread to all campus.
23. Laboratories should be constructed for students.
24. Academic staff should be encouraged to use the technology in the lessons.
25. Computers (laptop) should be supplied for every student.
26. Online environments should be constructed for student-student, student-instructor interaction.
27. Students should be encouraged to use technology.
28. All books in the library should be available made in the digital format to reach them online (Digital library).
29. New technologies should be taught to the students related with their departments (related software programs, and tools)
30. Laboratory usage opportunities should be increased for required courses.
31. Lessons should be watched from the internet synchronously.
32. Students should reach all the information and documentation about their lessons from the same database.
33. Projector should be used in the lessons.
34. Every course should have an up-to-date web page
35. The students should be informed about the available technologies in the university.
36. Additional resources of courses should be presented online.
37. Open course system, similar to the MIT's system, should be produced or enhanced in the university.
38. Updated versions of software should be provided and a budget should be reserved for this.
39. The exam results should be announced online.
40. Every department should have similar technological opportunities.
41. Every dormitory room should have internet connection.
42. The number of teaching software courses should be increased.
43. The number of technical support personal should be increased.
44. Technology usage of academic staff should be encouraged.
45. Technology use in the courses should be compulsory for the academic staff.
46. Students should have opportunity to reach online services of the library from out of the campus.
47. Access to technological facilities for students should be increased.
48. Licensed software should be used.
49. Web sites of the departments should be updated periodically.
50. Conferences should be given to inform new scientific innovations.
51. Participation of the students should be encouraged to scientific conferences.
52. A special budget should be reserved for purchase of new technologies.
53. Each classroom should have a smart board.
54. The number of the laboratories should be increased.
55. The NetClass (LMS that is used at METU) should be improved.
56. Computer labs in the departments should be divided into 2 parts. One of them is for doing the lessons; the other one is for the free working of the students.
57. The announcements of the courses should be made online.
58. Active participation of the students to the lessons should be supplied by technology.
59. Successful students should be awarded with notebook computers.
60. An instructional technology support centre should be constructed.
61. Academic personal should have pedagogical formation on teaching methods, student psychology, classroom management etc.
62. The video and the audio records of the lessons should be accessible to by all METU students (whether students registered to the course or not).
63. Available computer/software courses' content should be revised and improved.
64. Available computer/software courses' teaching methods should be improved.
65. Laboratories should be accessible to all students every time.
66. In the engineering courses, 3D supported technologies should be used during the lessons.
67. E-library should be revised and modified with respect to the requirements of the students and the academic staff.
68. All information about the grading should be accessible by cell phones.
69. Some parts of the lessons should be given online. (Blended learning environments)
70. Technology should be used in every area of the education.

71. The number of the conferences that is given via internet should be increased.
72. Library resources should be improved.
73. Every student should have equal opportunity to reach available technological resources.
74. Online communication should be compulsory for the academic staffs.
75. There should be appropriate classroom conditions that online courses will be given.
76. Different instructional methods should be used in the courses.
77. Required software should be available in all laboratories.
78. Internet connection speed should be increased.
79. Students should be informed about new technologies.
80. There should be computer laboratories in every dormitory.
81. Technology should be used in teaching a foreign language.
82. The use of the smart class should be increased.
83. In every department, there should be a technical staff who is responsible for maintenance of technological devices.
84. Online newsgroups should be constructed for each department.
85. The number of the overhead projectors in the classrooms should be increased.
86. Structure of the classrooms should be redesigned for using notebook computers in every classroom.
87. University should maintain to follow the technological innovations and their usage.
88. The video records of the respected instructors in their fields should be watched in lessons.
89. Web based education platforms for METU should be developed.
90. Technology courses should be based on practical application of the theoretical knowledge.
91. Visual materials in the library should be increased and the DVD/VCD archive should be constructed.
92. Some parts of the instructional content of the courses should be made available online to the society.
93. The projects in the Techno park should be put into practice.
94. More technology should be used in student affairs services.
95. Animations should be used in the lessons.
96. Student affairs information system should be improved.
97. METU staff should be trained about the technology use.
98. The number of the smart classes should be increased.
99. Students should participate in the Research & Development projects.

Discussion & Conclusion

Students frequently suggested that technological infrastructures must be increased. For example, students are not satisfied with technological facilities and they demand more educational environments that include technological media. In this study our findings revealed compatible and overlapped findings with the modern campus model of Langenberg & Spicer (2001). Most of the suggestions of METU students fit with the each component of modern campus. For instance, related to network infrastructure students expressed that technological infrastructure of classrooms should be supplied/advanced. Also, for network access device component in the modern campus model, students stated that the number of computer laboratories should be increased. They want to use various technological channels in class in order to participate actively in the courses. These expectations may be reconsidered in terms of existing unnecessary technologies. In addition, students stated that "lecture notes should be available online" and "video and audio recordings of the lessons should be done and these materials should be easily accessible". That is, students want to reach course resources and information whenever and wherever they want. Furthermore, students expect that accessible digital library anytime and anywhere by anyone in the suggestion 8, 28, 46, 67, 72 and 91. Also, students recommended that learning should be collaborative in the suggestion 10.

Consequently, in order to integrate technology in modern campuses, students want firstly necessary infrastructures and equipment, secondly opportunity to access learning resources at anytime and anywhere. These suggestions generally focused on the use of the Internet to reach the course materials, audio and video recording of courses, tools to communicate with instructors, and reaching digital library resources. Moreover, they stated that the technological infrastructures of the classroom should be improved, different educational technologies should be used effectively in the courses, and faculties should be trained on how to use technologies. Lastly, the other consequence is that suggestions and expectations of students are vital for creating modern campus and making necessary investments on

educational technologies. Therefore, students' suggestions will be used in strategy plan because their suggestions compatible with the literature and using this information in the technology plan makes the universities' strategy plans better.

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