

## Universities: A View to Pebbles of Mosaic

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□ *Abstract*— Educational systems vary widely between continents, countries, and even towns. In the United States, universities may be either publicly or privately supported (or a combination) and may be categorized as either research oriented or teaching oriented. In this paper we present an informal discussion of the relative advantages and disadvantages of the various university models from the perspective of both students and faculty.

### I. INTRODUCTION

TO keep the edge of competitiveness, Universities are forced to go global, become more diverse, and to nurture the spirit of entrepreneurship. In the rise of knowledge economy, where knowledge replaces physical resources as the main driver of economic growth, the traditional roles of Universities are changing [1]-[8], Fig. 1.

New technologies introduce new concepts, and an illusion that a need for a traditional classroom and fulltime faculty will not be necessary. However, since education is not the facts transmission, but rather about learning to argue and reason, and adding dimensions with a “human touch”, common sense suggests that community of scholars will outlast the changes. On the other side – new technologies improve visibility of Universities. For example, offering courses on Coursera [9] enabled Universities to reach individuals across the globe who would not have otherwise had an opportunity to engage with them.

Ranking of Universities has become increasingly important; mainly because it is envisioned to help prospective students simplify complex decisions and to prevent Universities to stagnant. Although ranking is important in pursuit of higher quality, ranking systems are criticized to provide an incomplete picture and that many important aspects are left aside or not covered with appropriate merits. Nevertheless, the best ranked Universities offer highly competitive environment, fast adaptation to changes, and attract individuals with a “drive” for success (Table I and II).

A perfect methodology to rank Universities does not exist, and each ranking system puts weight on a different main

focus. For example, the “Shanghai rankings” mainly focus to pure research [10], QS [11] to academic reputation, and Times Higher Education (THE), powered by Thomson Reuters, to teaching.

A membership to world-class University is not self proclaimed. It requires a long-term vision and dedication, and once there a strategies to keep a place in the club [12]. In the paper we present an informal discussion of fundamental power intrinsic to a nature of higher educational environment.

TABLE I.  
 TOP 5 PRIVATE US UNIVERSITIES IN THE QS WORLD UNIVERSITY RANKINGS

University	World Ranking 2013/2014	World Ranking 2008/2009
Massachusetts Institute of Technology (MIT)	1	9
Harvard University	2	1
Stanford University	7	17
Yale University	8	2
University of Chicago	9	8

TABLE II.  
 TOP 5 PUBLIC US UNIVERSITIES IN THE QS WORLD UNIVERSITY RANKINGS

University	World Ranking 2013/2014	World Ranking 2008/2009
University of Michigan	22	18
University of California, Berkley	25	36
University of Wisconsin-Madison	37	55
University of California, Los Angeles (UCLA)	40	30
University of North Carolina, Chapel Hill	54	102

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## II. FRAGMENTS OF MOSAIC

### A. Categorization

One can count more than three thousand Universities in the United States, with 600 major fields of study. Universities offer a wide range of undergraduate and graduate degrees, and serve as centers of research and scholarships. Public Universities are normally supported from state funding where as private Universities have endowment – a savings account built up from private donations and tuitions payments. Private Universities apply for government funding for research, and students at private Universities often receive government scholarships. Generally, the tuition in private Universities is higher than it is at public Universities. However, private universities offer financial aid for those students who excel academically regardless the financial background.

The selectivity of students varies widely among Universities. Some of the finest Universities in the country are public (Table II), such as University of California Berkeley, and there are many fine private Universities such as Harvard, Princeton, or University of Rochester (Figure 1), also Table I. There is spectrum of sizes in both public and private Universities. In general, the very largest Universities in the country are public, with as many as 50.000 students, but there are many public and private Universities with only a few thousand students. Most of the smallest Universities are private. The class size within Universities differs accordingly. In some very large Universities a class can have more than 100 students which forces lectures to be conducted in traditional lecture style. In smaller Universities class size averages around 20 students, which gives an opportunity for students to take an active role in discussions with professors.

Universities may be further categorized as research or teaching oriented. Research-oriented Universities provide the facilities for faculty and students, graduate as well as undergraduate, to conduct basic and applied research. Although teaching remains an important aspect in research Universities, a greater percent of faculty time is devoted to research in such Universities.



Fig. 1. Logo of the University of Rochester, one of the finest private, research oriented Universities in the USA. The University is an outstanding example of the academia-industry collaboration with return in investment ratio of 30:1, i.e. thirty million dollars in investment returns per every million dollars [8].

Teaching oriented Universities emphasize education. The majority of such Universities are relatively small. Such Universities, despite their small size, offer a richness of courses and often have modern facilities to support classes. However, due to limited facilities, research typically is not a priority in such institutions and most do not offer graduate degrees at all, or possibly only master degree.

### B. "Inside" the academic year

The academic year may be divided into three semesters: fall, spring and summer, or four quarters. One semester is 14 weeks in length and courses extends throughout the semester. Students normally take 4 or 5 courses each semester.

Most courses meet 2 or 3 times a week for a total of 3 hours. If lab work accompanies the course, it requires additional 2 hours per week. Instructor office hours are fixed during the week, but additional can be arranged by appointment. For most courses, students are given around 10 homework assignments, and two exams (midterm and final). To pass a course a student must meet the course requirements during the semester. There is not examination period after the course. Those students who fail may repeat the course next time it is offered. That way student is forced to leave no gaps in their course progress, or to postpone. Professors have to help students to understand and pass a course and the quality of professors' work is assessed with standardized forms filled in at the end of each course by the students. Comments from such forms provide useful feedback to the professors and university's administration to enable improvements in teaching.

Teaching assistants are graduate students paid from university-based funding (teaching, research or lab assistantships, tuition and fee waivers and stipends), and distributed according to the needs of specific courses to conduct recitations, assist in labs and hold office hours.

Fundamental courses, in the major disciplines, are regularly offered, and curriculum doesn't differ much between universities. Specialized topics courses may not be offered every year, and some courses may be specific for individual universities.

Course work is measured in credit hours. A course typically accounts for 3-4 credit hours, and about 120-130 credit hours are required for graduation. Most Universities require students to take courses in liberal arts (humanities, social and natural sciences), before settling on a specific field of study – a major, usually completed in the final two years.

Graduate students in a PhD program take courses and seminars that are designed to give a comprehensive knowledge of their chosen field. PhD research is the student's original work and advisor (a faculty member) monitors and guides the process, although the student carries out the research independently. Some graduate programs include a research master's degree programs leading to Master of Science and Master of Art for the master degree. Professional master's degree programs provide specific skills for particular profession and lead directly to

employment; examples are Master of Business Administration or Education.

### C. What makes a good University good?

University quality is not tied to the public/private or research/teaching categorization. Although many of the highest ranked Universities are private, there are many public Universities that have earned that position among the elite. Most of the universities are distinguished by their specific programs. Factors that determine Universities ranking include: excellence in research, faculty members held in high professional regard, high quality courses, large palette of courses for different programs, well equipped labs and classrooms, extensive libraries, and faculty who encourage undergraduate and graduate students to take an active role in learning and research.

In Universities with highly ranked programs in selected areas, there is often a positive influence on related programs.

Throughout their studies, undergraduate students are encouraged to participate in research, to implement their knowledge, to explore and to write papers, as much as their time permits. This experience will prepare them for academic or industry career after graduation.

A drawback at some schools is the practice of allowing graduate students to conduct complete courses, which may lower the quality of lecturing due to lack of experience and a heavy workload of graduate students. In high quality programs, graduate students may offer a few lectures besides recitation, under supervision of professor as a part of student's preparation for academic career.

In teaching oriented universities, public or private, professors must have an ability to relay knowledge and enthusiasm. In research-oriented Universities, faculty must combine excellence and enthusiasm for teaching with ability to conduct cutting edge research. In either settings faculty must show an initiative and be dedicated to their work.

### III. CONCLUSION

Periods of transition are always difficult. Learning by trial and error results when experience of other is ignored. Educational systems are built from people. No matter which model is adopted, people devoted to their work, having expertise, good equipment, well-constructed courses and attractive research programs that "draw" grants will result in success, which will attract high quality students and faculty to such universities.

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