

สภาพการณ์ของการอุดมศึกษาในประเทศไทย: ความมุ่งหวังของบุคคลระดับผู้นำที่เกี่ยวข้องด้านการศึกษา อาจารย์ และนิสิตนักศึกษา

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บทคัดย่อ

งานวิจัยนี้แสดงวิสัยทัศน์ และทัศนะเชิงนิเสธด้านโครงสร้างพื้นฐานของการอุดมศึกษาของประเทศไทย แบ่งเป็น 2 ส่วนคือ (1) การสัมภาษณ์บุคลากรระดับผู้นำที่เกี่ยวข้องด้านการศึกษา (2) แบบสอบถาม กลุ่มตัวอย่าง เป็นอาจารย์และนิสิตนักศึกษาจากมหาวิทยาลัย จำนวน 6 สถาบัน จำนวนรวม 535 คน

ผลการวิจัยส่วนที่หนึ่งจัดได้เป็น 2 กลุ่มคือ กลุ่มแรกมีความหวังโยในเรื่องการใช้ประโยชน์จากแหล่งทรัพยากร เช่น การสร้างตึก การใช้พลังงาน และถือว่ามหาวิทยาลัยในอนาคตจะต้องใช้แหล่งทรัพยากรธรรมชาติอย่างมีประสิทธิภาพ กลุ่มที่สองเน้นการบูรณาการเทคโนโลยีการสื่อสารทางไกลและเครือข่ายของมหาวิทยาลัยในการเรียนการสอน โดยทั้งสองกลุ่มมีวิสัยทัศน์เกี่ยวกับการเรียนรู้ยุคใหม่ และสนับสนุนความต้องการที่จะมีการเปลี่ยนแปลง และปฏิรูปกระบวนการจัดการ ผลการวิจัยส่วนที่สองพบว่า นักศึกษาสนใจและยอมรับแนวความคิดการเรียนการสอนผ่านเครื่องมืออิเล็กทรอนิกส์ และมหาวิทยาลัยอิเล็กทรอนิกส์ อาจจะเป็นรูปแบบหนึ่งของมหาวิทยาลัยในยุคศตวรรษที่ 21

คำสำคัญ: การวางแผนโครงสร้างมหาวิทยาลัย, การอุดมศึกษา, โครงสร้างพื้นฐานอุดมศึกษา, มหาวิทยาลัยอิเล็กทรอนิกส์, สภาพการณ์อุดมศึกษา

The Current Stage of Thailand's Higher Education Environment: The Perspectives of National Leaders, Faculty Members and University Students

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The study is an extensive survey on higher education infrastructure in Thailand attempting to illustrate the visions and the current contentions within higher education environment. The study composed of two major parts (1) series of interviews with the national leaders and key informants, (2) 535 questionnaires sent to the faculty members and the university students at six universities.

The findings of the first part could be grouped into two categories. One group addresses a concern on resource utilization with an inclination toward physical planning and building performance and held that new campus must be efficient in its use of natural resources. The other group focuses on the integration of telecommunication technology and networks for the future institutions. Both groups, have their visions for learning in the new millenium and are strong advocates of the need for major changes, strategic shifts, and organizational transformations. The findings of the second part showed the students were positive with the idea of attending courses by way of electronic devices. The concept of electronic university was suggested as a possible model for university planning for the information age of the 21st century.

Keywords: campus planning, electronic university, higher education, higher education environment, higher education infrastructure

Research Origins

Introduction

The motivation and initiation of this research began with the will to construct an ecological design guideline for the design and planning of new university campuses in Thailand. It was quickly found that the relationship between physical infrastructure and teaching pedagogy of higher education has yet to be understood. It was also apparent that the physical manifestation of educational environments cannot base solely

on the ecological processes of our physical circumstances. The interdependence of issues in both the planning and building design of mega-projects such as a university campus, are highly complex and, thus, require an extraordinary analysis of a number of competing factors including: user related issues, economic issues, political issues and technological issues. This study will depict the user-related elements applicable to the design and planning of educational

environment and illustrate the visions of and the current contentions about the higher education infrastructure in Thailand through interviews with Thai national figures and survey of students and faculty. This study attempts to identify their specific behaviors and a common ground among educational constituents. What it boils down to is whether the national figures' visions on education are compatible with the students' and teachers' aptness and discernment.

An Overview of Thai Higher Education

1. Science and technology manpower requirements

The success of Thailand economic growth were based largely on the expansion of relatively low-technology, low wage/skill production in such industries as textiles, apparel and basic electronics and sustained by a steady flow of foreign direct investment. In order to enable Thailand to move increasingly into higher value-added technology-intensive production as it loses its comparative advantage in low-cost labor-intensive industries, its pool of skilled labor must increase through effective education and training programs. While the broad-based human resource problem need to be addressed, the key leadership role in Thailand's technological transformation will be played by graduates in science and engineering produced by the universities. Yet, shortages of scientists and engineers have been widely reported and international indicators show that Thailand is not well-endowed with scientific and technical (S&T) skills. A low level of research and development (R&D) investment and little private sector contributions are another area in which Thailand is lagging (World Bank, 1997).

To counteract the situation, new faculties of engineering and science are being established in three other public universities. Plans are also being made for the establishment of 50 new district-level vocational colleges, 25 new polytechnics and four new public universities with strong faculties of science and engineering. Currently, admission to the faculties of science and engineering is based on the candidate pos-

sessing a secondary school certificate with the science/math concentration and on his/her ranking set by each university, obtained by the candidate's performance on the National University Entrance Examination. These requirements are applicable to all admissions to the public universities in the Bangkok metropolitan region. In the regional universities, 50% of the admissions is allocated to those who have passed the Entrance Examination and have chosen the regional university. The remaining 50% is allocated each year to secondary school certificate holders in the region who passed the regional university's own entrance examination. This approach has improved the equity of access to universities outside Bangkok and given rural students greater opportunities to study science and engineering and thereby qualify for high-paying employment in the future.

There are 15 schools of engineering in the public universities offering the B.Eng. degree in 23 disciplines. The structure of enrollments tends to reflect a past lack of emphasis on the production of S&T manpower. Enrollments in undergraduate basic science and engineering programs represent only about 23% of total enrollments. Anantapong (1997) indicated that the demand for higher education depended greatly on receiving job offers after graduation. This is reflected in a declining trend in enrollments in mining while there is a substantial increase in computer/electronics/information technology diffusion. Increasing enrollments are also evident in environmental engineering, as environmental legislation begins to impact on infrastructure services and in industrial engineering, as industrial productivity gains have captured the attention of industrial managers.

2. Academic faculty

One of the constraints to increased production of science and engineering graduates is the difficulty in recruiting and retaining qualified staff in public universities. In order to attract more qualified scholars to public universities, the Ministry of University Affairs needs to: (1) improve the academic working conditions and

R&D facilities; (2) support the transfer advanced technology from abroad; (3) expand S&T cooperation with other countries.

The current practice of many departments to offset the shortage of qualified faculty is to depend on part-time teachers and professionals. This, however, is not the best solution to introduce new curricula or to set up modern laboratories. Foreign professors are also being recruited when possible, but budget is a major limitation. Some other means of overcoming the deficiency being looked at by the Ministry of University Affairs is the utilization of the global networks. They envision an increase in students' opportunity and familiarity with the activities in the industry and other research institutions. Such connectivity also allows senior students more resources to carry out project work in which they gain vital research experience. The introduction of information networks may further lead to a new attitude towards interdisciplinary collaborations nationally and internationally; especially with the current strict national budget, electronic communications and tele-education seems unavoidable.

Part I Perspectives of Thai National Figures

1. Significance of their viewpoints

In the past, the successes of the educational reforms had always been those in accordance with the political will and decision-making at the central level. A series of interviews were, hence, conducted with top educational planners, chief educators, policy makers, leaders in educational businesses and also those who have visions of what the future universities in Thailand ought to be. This is to determine and identify the constraints that exist in the current physical environment and organizational structure which stand between the visions and the

achievement of educational development goals.* Their outlooks on future universities will influence the design and transformation of the higher education system in Thailand. Ten key informants representing university administrations, Ministry of Education, government officials, large corporations, some of which operates schools, and non-profit foundations which have vested interest in reforming education, were interviewed.

2. Findings from the interviews

The informants' attitudes toward future university development can be grouped into two categories with some crossovers. The first group of informants is concerned with providing a responsible development for higher education. They believe that future campuses, aside from being conducive to learning must also be efficient in its use of natural resources. Buildings consume a large fraction of most nations' energy budgets (Pitts, 1996). This fact associated with buildings cannot be ignored when planning future educational infrastructure; a fundamental shift of emphasis toward building design and construction practice which increases energy efficiency, and reduces environmental depreciation must be promoted, without compromising the pedagogical requirements. Therefore, the operations, site and building designs for new campuses require changes to meet both environmental concerns and educational goals. The design of Shinawatra campus is an example. The building complex, designed for 5000 students, is raised on columns to allow the continuation of natural landscape and topography and minimize the damage on local ecology. The selection of building materials and the structural compositions were designed to provide information-bringing "a library" to the students. Additional students beyond 5,000 are to be accommodated via network connections called *Virtual Univer-*

*Goals: (1) to allow more access to science and engineering studies; (2) to foster the skill and produce qualified graduates in science and engineering fields; (3) to increase research and development activities in higher education and (4) to instill in the students a concept of life-long learning. These goals lead to the planning of new science and engineering campuses and influence the desire for integration of information technology into the new facilities.

sity.

Other suggestions were also indicated. Campus buildings should not exceed 4 stories not only to avoid the use of elevators and maximize natural light, but most importantly, to reduce segregation. Several observations have shown that when buildings increase in height, students do not mingle. Floors are more confining than walls (Burlage & Brase, 1995). Such design has adversely affected creative collaborations among students as well as faculty members. Visits, conversations, and socialization tend to take place more easily in horizontal spaces. In addition, faculty-specific libraries should be discouraged because such organization reduces the chance of meeting among departments, and therefore, is not conducive to interdisciplinary efforts. Thematic libraries such as humanities, sciences and engineering library should instead be considered. Additionally, the future campuses should also be located close to a town and have direct access to highways or main arteries to encourage public transportation and creative cooperation among different communities for social learning.

Physical proximity is believed to be critical to multi-disciplinary teaching and research, and multi-disciplinary work is crucial to a research university, particularly so for the laboratory-based sciences and engineering, where teamwork rather than the efforts of isolated individuals is vital to research productivity. Thus, campus buildings should be organized in a group system; e.g., science fields should be located in one area to generate and enhance *facility and knowledge sharing* and avoid underutilized spaces. When buildings are closer together, roads and pavement are automatically reduced.

The fact is campuses will always expand to accommodate growing population. Small colleges will become larger and want to be recognized as universities. Yet, with advancing digital technologies, the dilemma is whether increased enrollments require increased space and new buildings, as the old established formulas require.

The second group of informants believes that Thai society is moving from the agricultural base to an Information Age. The educational system is moving towards universalism. Science, computers, the widespread use of English, the newly international economy, faster travel, and much else are pulling people toward more common practices in most tasks including higher education. The educational system in Thailand needs to reflect and respond to these changes and take advantage of the information network in order to efficiently move into the industrial phase. So far the country's human resources have clearly failed to develop at the rate necessary to compete in this global arena. These national leaders anticipate radically updated modes of teaching and learning in order to serve students in all corners of the nation with an education that inspires and enables them to become lifelong learners. To accommodate an ever-increasing number of students or learners under the traditional approach, the new facilities will undoubtedly be continually amplified. This is a colossal investment, particularly during the current, end-of-20th century, economic turmoil. Besides, today's educational system does not support the needs of the majority. Those who live far from city centers do not have as much opportunity for higher education. The educated segment of the Thai society continues to consist mainly of small elite groups in Bangkok, trained far beyond the standard of the remainder of the population (Haddad, 1994).

The *virtual university* concept, which based on advance network technologies, is being introduced with an intent to create equality among Thais-allowing those who hold full-time jobs to further their education. Virtual university or TeleEducation is far cheaper per student than the traditional university paradigm. This group of informants believes that TeleEducation can be used with any field of studies including engineering, but it is most appropriate for social sciences and humanities.

Under the National Education Bill (1998, Provision), which aims at extending edu-

education beyond university borders to enable learners to develop themselves at their own pace and to the best of their potentialities, the traditional lecture does not readily allow such practice without hindering other students or adding cost to the institution. Besides, deficient number of qualified teachers remains a pervasive problem. TeleEducation, therefore, emerges as a logical alternative where multi-media are being used at students' disposal and where the educational services need to reach out to the students either at their home or in nearby communities. Electronic transfer of information and communication can empower individuals to learn about their own interest at their own pace. Such empowerment can help foster an attitude toward self-motivation and self-learning and may yield a self-discovery process (Johnston, 1987; Knupfer, 1988; Garder, Simmons & Simpson, 1992; Askar, Yavuz & Koksak, 1992).

That the future universities will be technology-oriented is a given. However, teaching via video conferencing has not worked in Thai university-settings so far because of a cultural stance toward collaboration. Specifically, unless a university lacks instructor for a particular course, sharing materials between two instructors from different institutions are rarely realized. Each instructor wants to work at their own pace and on their own schedule. Within such culture, future universities in Thailand may need to be conceived in multiple units, dispersed into different localities but stay connected to a central education node. Each unit will offer a limited selection of courses but relevant to the local needs to avoid overlapping of expertise. Future universities should be smaller, therefore more efficient, but distributed instead of centralized. A university should be conceived as a learning network to support life-long learning.

3. Summary of the visions

It is essential that the two variant visions are combined. All of the interviewees are strong advocates of the need for major changes, strategic shifts, and organizational transformation. They knew that the choice is clear: transfor-

mation or degradation. The Thai authorities are well aware of the need to modernize the educational system, to make graduates more employable, to meet the manpower requirements of the changing Thai economy, as well as to address the rural/urban inequities (Haddad, 1994). Both groups have their visions for learning in the 21st century and how they plan to transform Thai higher education. They point to the current issues and what is likely to happen to colleges and universities in the coming years. Some of their viewpoints are not definitive but rather imaginative and provocative, which are not instructions for an educational reform. Their importance is not in the details of their visions but rather in the compelling picture about what Thai higher education and its environment might look like when built on radically new premises: energy scarcity and the emerging Information Age.

Part II Students and Faculty's Demeanors, Needs, and Suggestions

1. Questionnaire

Two closely matched sets of questionnaire were constructed and developed to obtain ideas and suggestions from Thai university students and instructors regarding their existing surroundings and to identify the benefits from and their attitudes toward the electronic connectivity within the current physical conditions. The questionnaires were based on the pointers received from the key informants and rested on the conviction that information technology and networks would be integrated into future learning environments. The questionnaire was constructed and checked for validity by using the table of specification and consulting with an expert panel. They were then tested with two pilot groups of students to determine their clarity, ease of response and optimum length. After the modification and adjustment, the questionnaires were administered to collect data.

2. Sample selection

The stratified random sampling was used in the sample selection. Six universities were randomly selected: three universities located in

the Bangkok Metropolitan area and three universities located in the regional areas. The students who registered in the fields of engineering or science-related areas were drawn for the study.

3. Findings and interpretations from the questionnaires

A total of 535 questionnaires were distributed during the summer of 1998. Ninety percent of the questionnaires was returned. A number of issues were identified. First, the facilities of universities in different regions were not equivalent. Students in the regional areas wished to study at the universities in Bangkok and petition mainly for relief and resources such as dormitories, better food service facilities, transportation and closer activity areas (museums, conferences, exhibits & expositions), while the students attending the universities in Bangkok asked for remedial additions such as cleaner facilities, parking areas, elevators, and air-conditioning units. However, both groups had their highest demand to be better connected to the information networks. The greatest attention in terms of campus facilities was given to the computer center, library, and recreational areas.

Second, while most of the faculty had some contact with foreign institutions, students had little of such intercommunication. As much as 91.4% of the students who participated in the survey had no contact with any universities abroad, while 91% of the participating instructors did. Only 6.7% of the students were in touch with educational institutions outside the Kingdom of Thailand. Most of those students who had some contacts with universities abroad were corresponding most with US institutions and some with Australian and British institutions. A consensus speculation, gathered from subsequent interviews, is that the deprivation of international communication was due mainly to an English-language barrier and partially to the restricted facility access. Sangsupata, et. al. (1999) showed several difficulties in the Internet utilization in a Thai university which includes: language difficulty, technological difficulties (e.g., slow access, telephone signal problems typically through

modem connection, and the instability in campus servers), and inadequate administration and distribution of the computer facilities (e.g., limited time of using the Internet).

Third, computer support for teaching and learning was modest to non-existent. This dearth handicapped our study and observations, which aimed to identify the physical constraints that prevented a successful integration between building structures and the information technology. We instead redirected our study to uncover the extent to which the students in this traditional educational setting were willing to engage themselves electronically in courses and relying less on the face-to-face classroom setting; a question was posted to all of the survey participants:

“Currently we can communicate with other parties all over the world (almost) instantaneously. The opportunity of taking courses offered by foreign institutions has been elevated. Because of this capability, there is an interest in on-line education via the Internet. However, due to the time differences among regions across the time-zones, the current 8AM-5PM schedule does not readily allow universities to offer such service. Can you visualize a university that offers courses 24 hours a day, 7 days a week?”

Over 63% of the participated students were enthusiastic about such an opportunity for various reasons. The most repeated justifications had to do with the notion of a bountiful array of courses and the efficient use of time and facility allocations. They also felt that it would assist in raising the standard of Thai education to the level of world standards. In addition, they foresaw the opportunity to learn at their own pace. Furthermore, when asked for visions of the *university of the future*, a compelling number of students' suggested a *computerized university* equipped with remote classrooms and distance learning as a new model, which reinforced the findings of the earlier studies. Half of the participating instructors in this survey were also positive about such educational prospect, unrestricted by time

or boundary. But most importantly, they foresaw a major change in the pedagogy in Thai educational system from students' dependency on "spoon fed" style of instructions to self initiated learning.

However, a number of students opposed to the idea of *offering courses around the clock*. They felt that this approach may work only within the elite institutions where there is abundant computer access. They feared that the majority of the students would not likely be as fortunate and such courses may not be equally and easily accessible to them. Besides, the number of choices was perhaps too overwhelming and disproportionate to be logical. For some instructors, managing campus facilities in such educational proposition seemed to present the greatest difficulty.

Fourth, a centrally located Computer Center seemed a wrong path. Such approach is not favorable or instrumental to the integration of electronic connectivity into a learning milieu. Most of the students did not have personal computers at home. Our study showed that students use departmental computer facilities, which usually were in the form of computer rooms rather than terminals in classrooms, and avoid making trips to a computer center. When a computer lab became a destination, it was a struggle for both faculty and students to fit technology use into their daily responsibilities. Besides, the students use the computer facilities mostly between lectures. The process of signing up, limited use and operation time, user fees and distance all discourage the use of computer facilities. Respondents asked that the computer facility and access should be decentralized and integrated into dormitories and classrooms at various locations. Thus, the investment of a large and centralized computer center must be weighed against the distributing facilities campus-wide.

Fifth, there was a general consensus in the level of desirability of assisting tools for learning among students and instructors, but with one exception. While the students' survey indicated that computers were ranked first as the

most desired tools to assist learning, the instructors are more interested in increasing the numbers of books and publication in the library (see Table 1). This finding can be rationalized by the fact that most instructors have personal computers in their offices while a large number of students have to share a limited number of departmental computer resources.

In our students' survey, the library books rank only a miniscule lower than the computers for needed educational resource. The library system in Thailand is still fragmented and lacks adequate numbers of publications in many fields of study. Hours of library operation are short and often limited to the university's own enrollment (Ministry of University Affairs 1998). The Internet access ranks lower than book categories. An interpretation is that students are not using the Internet for research and information retrieval. More than anything else, the Internet are being used mostly for luxury communications rather than information retrieving (Sangsupata, et al., 1999), or as a means of teaching and learning (Kongsuphakup, 1996; Ritthongpitak, 1997). A number of studies showed that Internet access still does not yet rank among the most highly desired learning tools for Thai students (Kongsuphakup, 1996; Niamhom, 1998; Sangsupata, et al., 1999). Nonetheless, the use of the Internet has increased rapidly from 1996 to 1999 due to its capability for live communication and to students' desire to remain current (Ritthongpitak, 1997). However, television and

Table 1. Distribution of the Most Desired Tools to Assist Learning

Categories	Percentage & Rank of desirable	
	Students	Faculty members
Computers	21.63 (1)	21.38 (2)
Library Books	21.58 (2)	26.10 (1)
Textbooks	18.89 (3)	19.18 (3)
Internet access	17.19 (4)	17.92 (4)
Television	10.75 (5)	11.01 (5)
Cassette tapes	3.85 (6)	1.26 (6)

tape recorder are at the bottom of the desirable technologies for learning. Students perceived television and tape recorders as poor tools for teaching and learning because of their one-way communication and the looming perception of great distance.

Whether or not they endorsed the use of the telecommunication technology for teaching and learning, the overall consensus of the respondents was that they could not and would not allow a complete virtual environment to replace the physical environment of higher education. Which parts of a university need to remain physical is unascertained, but a middle ground is inevitable.

Sixth, the most frequented campus facilities and preferred places selected by students and faculty members were almost identical in both student and faculty survey regardless of where their universities were located. Clearly, classrooms were where the students and faculty members would visit most often. The questionnaire result confirmed such preconception. Yet, libraries, outdoor landscape, copying areas, laboratories/studios, and computer facilities rank among the highest choices of desired facilities. It is unclear which facility is dictated by necessity and which is dictated by their aspiration. Nonetheless, the high utilization of copying areas is something worth observing. The significance of the overwhelming request for copy areas may at first seems trivial. However, such need signaled many inadequacies within the higher educational environment in Thailand. The lack of textbooks and sources of information have long been a problem for students and scholars, particularly acute in the majority of Thai students who is living below poverty level. Most students were not able to purchase an entire textbook. Thus, they copy what they need at a very low cost through copy centers.

Since the universities in Thailand have traditionally encouraged social activities, the students also used these facilities as meeting and social places. Three of the most popular spaces are: (1) air-conditioned library, (2) protected

areas of student centers and (3) playfields/green areas with mature trees for shade. The students often use these facilities for refuge, either from the crowd or from the heat in the summer, which could reach 40°C.

Seventh, students and faculty members would rather use fueled modes of transportation over walking or bicycling even if the distance is less than 5 km. The establishment and location of a university will infer the movements to and from the campus. From the survey, about 40% took buses and 27.5% walk or bike, 16.7% and 16% used motorcycles and automobiles as their means of transportation respectively. We further found that students in Bangkok drove far more than those students attended the universities in regional areas. Subsequent interview revealed that, more often than not, driving was not justified by necessity but was intended as a means of displaying wealth and status.

A Chi-Square statistical analysis (Yamane, 1973) was employed to determine the variance between students' decision on the types of transportation used, i.e., fueled vehicles versus non-fueled modes of traveling [walking or biking]. The analysis verified that the majority of students preferred to use fueled modes of transportation regardless of the distance. In other words, students would not walk or bike more if they could drive or ride a motorcycle even when the distance was less than 5 km ((3 miles). A similar result was found in the corresponding study of the faculty members. Even within their own campus, students and faculty would rather drive or ride a motorcycle than walk or bike even if such options were available.

Conclusions and Suggestions

This study has covered a lot of ground from the subjective areas of students' attitudes and national leaders' visions to the more objective analysis of transportation use. In general, the majority of the participants in this study are willing to accept new ideas of the mixed-system between electronic connectivity and place bound teaching. The findings from this study should

provide a holistic account of the current attitude and needs within Thai universities.

From the survey, it is clear that students and faculty are not being served with adequate instruction and learning tools, neither with the traditional support of books nor the prospective tools of computers and the Internet connections. Nonetheless, both students and instructors are eager to make educational transformation and willing to cope with the difficulties. The policy makers, educational leaders and planners can expect both the students and faculty to support their vision toward electronic connectivity and distributed subdivisions of universities throughout Thailand.

It is also clear that the physical infrastructures, not only in terms of networks but also the campus itself, are necessary and will continue to be designed and constructed. We, at least, have touched on the issue of transportation, so that urban planners and designers may be able to better plan for more responsible campuses that respond to environmental issues. Since both students and faculty members typically use fueled modes of transportation over walking or bicycling even if the distance is less than 5 km, future surveys may need to break the range down into shorter distances-to find the optimal distance that the majority of people are willing to walk or bike. We also noted that social condition was partially responsible for the greater use of automobiles.

We have identified a strategy for integrating computer facilities into campus planning. The centralized computer center must be reconsidered and weighed against distributing facilities campus-wide. There seems to be a lack of distribution within each existing campus at the present. This internal improvement may be the first step toward networking among different universities throughout Thailand.

Unfortunately, only minimal attention is being paid to the holistic approach that combines the physical environment of the university campus with the indispensable flux of information via telecommunication infrastructure. There is

an extensive number of studies that focus on the approach of digital media in educational setting (Pirolli & Russell, 1990; Azemi, 1997; Lautenbacher, 1997; Rafe & Manley, 1997; Pullen & Norris, 1998) and on their effectiveness in teaching and learning (Daily, 1994; Keeler, 1996; Owston, 1997; Novak, 1997; Jacobs, et al., 1998). However, what consequence the digital media will have on the architecture of university is literally unknown. The faculty, architects and planners of future universities can take some pointers from this fieldwork in design and planning of future universities. The fact is, certain components of the university will always need to be constructed and certain parts will need to be modified to support the changes and new movements. The criteria for the physical design are unclear-again, because the effects of information technology on the physical level of the design are not yet known. One thing, however, remains unchanged. Colleges and universities want flexibility. No one wants to lock into something that will force them to operate the same way for the next 25 years.

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