

5-2012

Managing Educational Information Technology (IT) Transformation

Dina Rateb

The American University in Cairo, dfr@aucegypt.edu

Sherif Kamel

The American University in Cairo, skamel@aucegypt.edu

Follow this and additional works at: <http://aisel.aisnet.org/confirm2012>

Recommended Citation

Rateb, Dina and Kamel, Sherif, "Managing Educational Information Technology (IT) Transformation" (2012). *CONF-IRM 2012 Proceedings*. 10.

<http://aisel.aisnet.org/confirm2012/10>

This material is brought to you by the International Conference on Information Resources Management (CONF-IRM) at AIS Electronic Library (AISEL). It has been accepted for inclusion in CONF-IRM 2012 Proceedings by an authorized administrator of AIS Electronic Library (AISEL). For more information, please contact elibrary@aisnet.org.

Managing Educational Information Technology (IT) Transformation

Dina Rateb
The American University in Cairo
dfr@aucegypt.edu

Sherif Kamel
The American University in Cairo
skamel@aucegypt.edu

Abstract

Private universities are emerging rapidly in Egypt and are facing a number of critical challenges. Educational Information Technology (IT) is considered one of the most important factors for competition, survival, and sustainability in the education industry. Any change in technology consecutively affects other factors and vice versa. With the move of the American University in Cairo (AUC) from the downtown strategic location to one of the suburbs, many constraints and challenges were imposed coupled with the implications associated with Egypt's uprising. To guarantee sustainability, there is a need to manage properly educational IT performance. However, as Hoerner (2008) stated, "*indicators are needed for sustainability because you cannot manage what you do not measure*". To identify the indicators of sustainability and the factors that affect them, *satisfaction* was used as surrogate measure for educational IT performance. This paper demonstrates the experience of the American University in Cairo in deploying IT in education while going through school and university transformation and a nations' uprising with a number of lessons learned, and opportunities created for different stakeholders in the national educational ecosystem.

Keywords

Educational IT, managing IT resources, IT and universities, IT transfer and deployment, IT sustainability, Egypt

1. Introduction

The American University in Cairo (AUC) was founded in 1919 fully dedicated to both education as well as service in the Middle East region. In 1960, AUC enrolled around 400 undergraduate degree students as opposed to over 6,300 students today both graduate and undergraduate. In 1993, the school structure was introduced to the university and it included three schools offering academic degree and non-degree curricula; school of humanities and social sciences (HUSS); school of sciences and engineering (SSE) and the school of business, economics and communication (BEC). In 2009, the number of AUC schools reached six. In addition to the above, BEC was restructured to become the school of business (BUS), the school of global affairs and public policy (GAPP), the school of continuing education (SCE) and the graduate school of education (GSU) were introduced. In 2012, the university enrolments include 5,100 undergraduate degree students, over 1,200 graduate degree students and more than 80,000 non-degree students.

AUC remained the only private university in Egypt for decades until new universities came into the market based on a new law for private universities in 1996, more or less a clear case of monopoly, despite the fact that there some competition with a large number of public

universities that exist and a growing improvement of high-quality education they offer. With the emergence of a number of private universities in the region, the status of monopoly is gradually disappearing, good for competition and better for educational quality. However, AUC still provides the highest quality education in the region and is the only university in Egypt and Africa to be accredited according to the Association to Advance Collegiate Schools of Business (AACSB) International. Moreover, AUC is known to have the best technological teaching facilities in the nation in terms of infrastructure, students and faculty to technology ratios (<http://www.aucegypt.edu>, 2010). AUC is a nonprofit organization in spite of the fact that it is a private university. The university is governed by a board of trustees representing different areas such as business, law, education, and philanthropy who volunteer their resources in support of the university (<http://www.aucegypt.edu>, 2010).

2. Technological Overview

The networks and mainframes were always centralized under one IT department that was established under the name of “*computer center*” in 1970. A century mainframe was rented from NCR to perform all the university’s administrative and academic functions such as payroll, English language placement exam scores, examination schedule, and registration. Moreover, AUC “*computer center*” carried out external work as well as statistical reports for many large organizations and ministries such as the Food and Agriculture Organization (FAO), the World Bank, Ford Foundation, and Egypt’s ministry of health, and family planning organizations (Amer, 2010).

In 1983, an IBM mainframe was bought to replace the rented NCR mainframe and all existing programs at that time went through a long conversion process to suit the new IBM system. In 1984, SAS software was installed on the IBM mainframe and sophisticated statistical reports were generated using it. Moreover, many PCs were introduced in selected academic departments (Amer, 2010). In 1995, AUC replaced the mainframe by several servers and PCs to cover the needs and applications of the university. The upgrades and changes in the technological infrastructure was part of a regular continuous improvement approach implemented by the university administration. Additional restructuring took place in 2002. The “*academic computing services*” (ACS) was divided into “*academic computing services*” (ACS) and “*university network services*” (UNS); where the latter became part of the “*office of vice president for computing*”, a position that was introduced to handle technology-related aspects, today it was transformed to become chief technology officer (CTO), while the former remained part of the library. In 2005, the classroom technologies and media services (CTMS) unit was launched under the umbrella of the library (Amer, 2010).

During the academic year 2008-2009, the move to the new campus took place. This was a major landmark and turning point for an educational IT at AUC since the culture, attitude, norms, and behavior changed dramatically with the move to the new location and the surrounding environment. AUC new campus is located far from the center of Cairo and everyone has to commute for a long time to get there. AUC provided a network of Wi-Fi-based buses with 36 locations for commuting. It should be noted that it is a newly district, it is still not well lit, the roads are not that safe for driving at night, and it is not that secure in general. This made a big change in the students’ habits. Historically, students used to work for very long hours in the university labs when the campus was located downtown. Teamwork and collaboration was very popular among the students back then especially in the labs. Students loved staying up late to finalize assignments and projects in the university downtown labs. They occasionally asked for the labs to stay opened overnight. Cairo downtown area was very safe even for young females going back home in the middle of the

night or even at dawn. The new campus district is still not well inhabited and relatively it is not considered a safe neighborhood. Respectively, a significant drop in the demand of the lab usage in the evening ensued. This along with Egypt's uprising of January 2011, AUC students' habits and safety concerns were transformed.

The school of business computer center (BCC) has teaching labs, "drop-in" labs, and labs that could function as both teaching as well as drop-in. Although priority was given to the courses being taught at the school of business, labs were reserved for other departments and schools. Students' extracurricular activities are also a major part of the school's mandate and are greatly encouraged by making those labs accessible to all student clubs and conferences on campus. The BCC now holds about 100 PCs (running the window platform) and about 150 Apple (running both the window platform as well as the Apple OS) supported by a number of printers, scanners, smart boards, media shows, projectors and other specialized hardware. There is a variety of general and specific software to facilitate teaching in the different areas of specialization.

The BCC home page is available at <http://www.aucegypt.edu/business/bcc/pages/home.aspx>. As previously noted, the BCC has always been the first to introduce most of educational IT on campus such as video conferencing and interactive smart boards. A list of all educational IT tools is available on the school website. There is a webpage showing the qualifications of lab assistants and supervisors to allow students to know who to talk to if an expert opinion is needed <http://www.aucegypt.edu/Business/BCC/Team/Pages/default.aspx>. The ftp site for the BCC is <ftp://bcc.aucegypt.edu> with an additional webpage dedicated for reservation requests for labs and IT classrooms and mobile presentation equipment. There is also a webpage for the physical layout of each lab and center and its full information on the different facilities <http://www.aucegypt.edu/Business/BCC/Labs/Pages/Home.aspx>.

As for the economic climate, the recession worldwide did impose some restrictions on the budget spent on education in Egypt. This along with the enormous amount of money needed for the construction of AUC new campus, the budget and the amount spent in general and on educational IT in particular had to go through severe cuts especially with Egypt's uprising that was accompanied with instability and the notable decrease in donations. Ironically, on the one hand, top management wanted to introduce major cuts on educational IT and on the other hand, they were still supportive in terms of investing in the school of business and help it grow given its status in Egypt, the African and Arab regions.

3. Setting the Stage

In order to analyze, design and implement the educational IT assessment project at AUC, a number of attributes were identified. According to Martin (2003) integration, flexibility, and the overall interaction of systems as well as people and the way they act on information are important attributes for managing an information system. The Leavitt model (figure 1), emphasizes the influence between task, technology, people, and structure where a change in one usually results in retaliatory change in the others (Leavitt, 1965) and where all are intertwined in mutually dependent relationships outside of which none have much meaning.

Task is the organization's *raison d'être* and here we are dealing with not-for-profit organizations which is AUC located in Egypt. Task is not-for-profit-oriented, mainly focused on education and to some extent on the social welfare of the community; however, from an educational standpoint. Examples of the social welfare are the scholarships that AUC offers to the public schools, and to the different governorates, such as the Leadership for Education and Development (LEAD) program and those offered to students who get top grades in high school; over and above the services provided to the poor and needy through a comprehensive extracurricular activities program.

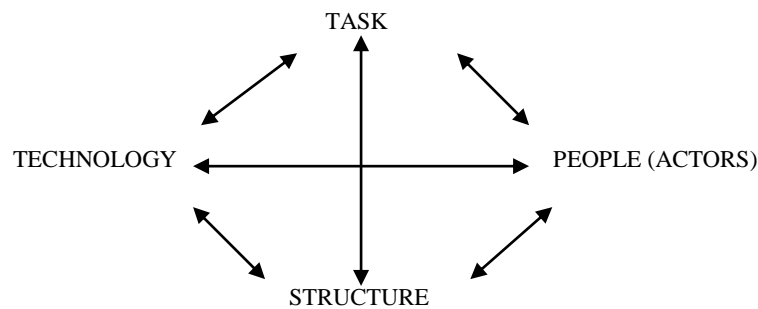


Figure 1: Leavitt's Diamond
Source: (Leavitt, 1965)

Actors are people who act and need not be exclusively humans (Leavitt, 1965). In this research, it will be the faculty, staff, and students at AUC as well as the Chronicle of Higher Education, the accreditation-granting institutes whether local or international, in addition to the major donors. Technology refers to the hardware, network and the like as well as the technical competence and skills of people/actors. At AUC major changes took place during the period 2008-2010 that allowed computers and communication via the net to be more readily available. Additionally, the wireless network became accessible all over AUC new campus versus only in designated areas, as was the case in AUC Tahrir campus (downtown). Moreover, as indicated before, Wi-Fi technology was added in AUC buses to optimize the use of time given Cairo's traffic. Structure, refers to the systems of work flow and communication (Leavitt, 1965). Here the concern will be on internal and external operations. In general and along with the move to the new campus, AUC gradually adopted a centralized approach. As previously discussed and as will be elaborated upon hereunder, the formulation of a standalone school of business and its semi-autonomous status from the university, has greatly affected the direction and vision of top management at the university level. It also played a major role in promoting educational IT. Moreover, Egypt uprising left a huge effect as well.

4. Case Description

During this decade, the department of management of the school of business has undergone a comprehensive transformation of its business education system. The strategies pursued to accomplish this transformation included: comprehensive curricular restructuring, the use of the latest educational IT, and the integration of industry in the business education process. Five years ago, the department of management got its AACSB accreditation and maintained its status in its review process in December 2011. The transformation of the business education system has been institutionalized mainly aiming at continuous improvement; and in parallel, all educational IT was aligned with the same objective. The use of educational IT is causing significant transformation in the way universities and the like meet their mission (Roch and Behling, 2007).

The mission of the school of business computer center (BCC) is to complement the school of business mission and to develop leaders who are technologically proficient by sustaining the school's offering of high quality education, whether inside or outside class, to qualified

students. In addition, BCC strives to provide eminent educational teaching IT services to faculty while focusing on continuous improvement and commitment to excellence.

In AUC Tahrir campus, the BCC labs were mostly located in the Jameel Center on the ground, third and fourth floors. This location was very strategic as it was adjacent to all other classrooms; everyone knew where they were and it allowed easy access. With the move to the new campus, the labs are now located opposite to the library in the first and second floors in the Jameel Building, where usually one gets lost to get there given the size of the campus. As soon as AUC moved to the new campus, a significant change in demand on some labs was noted. Surprisingly the demand in the library labs increased while the demand on the BCC labs decreased but both had a significant decrease in lab usage in the evening. It should be noted that at least 4,000 of the students experience both Tahrir and new campuses. This was quite a phenomenon especially that the boost in the library labs usage was to the extent that, more often than not, there was a waiting line. The BCC conducted a survey during the academic year 2008-2009 to be able to track down and analyze the changes that resulted due to the move (figures).

The reasons for students choosing a lab versus another included free of charge printing, the availability of assistance, ease of Internet accessibility, facilities, alternatives, location and "other". As shown from figure 2 hereunder, on the one hand, the ease of Internet accessibility (21%) and the location were the biggest concern (31%). On the other hand, the least concern was what was termed "others" (4%) which includes things such as the major and the proximity of those labs and the classes students are enrolled in during that semester (the right side of the figure 2).

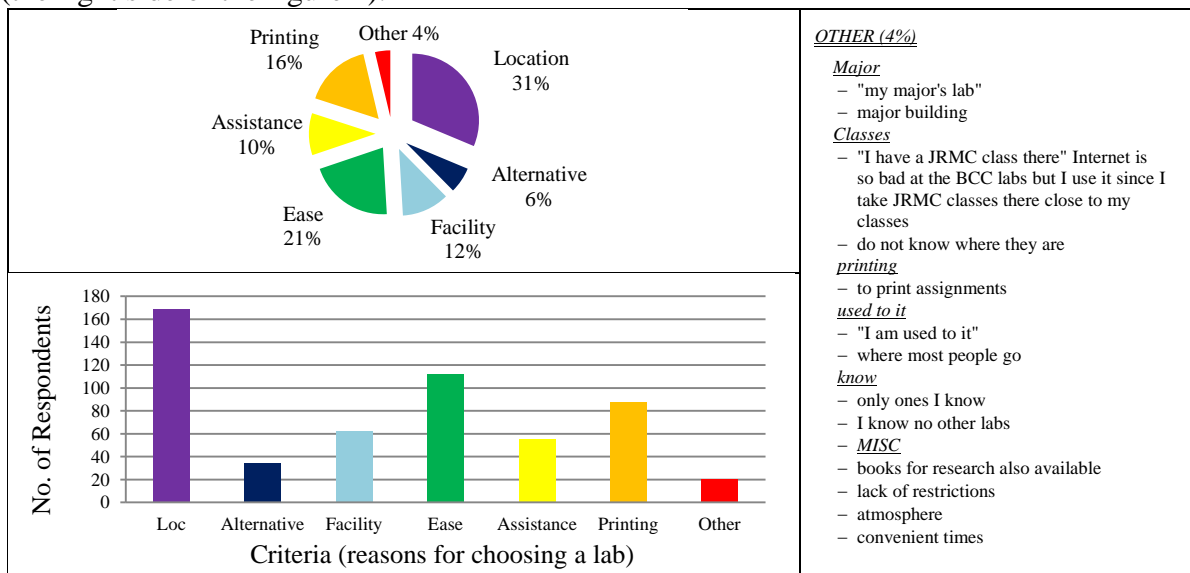


Figure 2: Reasons for Choosing a Lab

The location being so important, it was further analyzed. The BCC labs are located close to gate #4, which admits way over 70% of the university community as it is the only entrance for anyone who uses the bus (over 50% of the total student body) and the majority of the cars are parked outside that gate. Although the library labs are located a little further from gate #4, they have a strategic location in the Bartlett plaza floor where it is very easy to find and access. The BCC labs, on the other hand, are located on the first and second floors of the Jameel building where students are not allowed to use the elevators; only faculty and staff are. The building is quite confusing and is considered a maze to most of the faculty, staff and students.

Students were asked to rate the following reasons for choosing a computer lab over another; availability of help in the computer lab; “my friends go there”; location of the computer labs; availability of the software; Internet access; Internet speed; as well as “others”. The students rated the location and the Internet as the highest; it is important to note that both are out of the control of the school of business (figure 3).

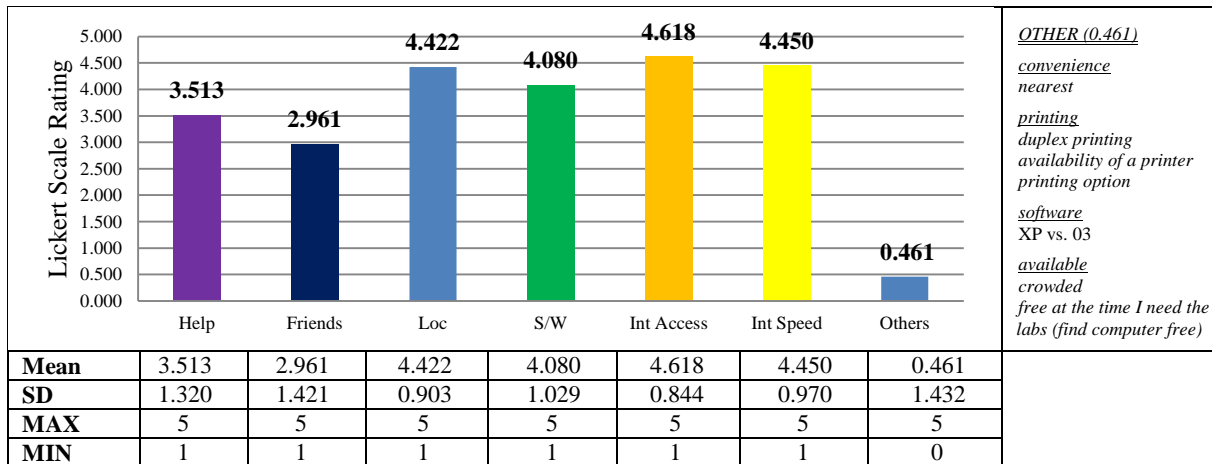


Figure 3: Rating of Criteria

“Assessment and evaluation are increasingly widespread activities in education, at every level throughout the world. The results of assessment are used by learners and teachers to guide teaching and learning in the classroom, by employers and academics to help select employees or students, and by local, national and international policy makers to evaluate the efficiency of their educational systems” (EERA, 2010).

Kizlik (2010) clearly differentiates between measurement, assessment, and evaluation in education. In this respect, we measure satisfaction, assess learning, and evaluate the results in terms of preset criteria. To carry out the educational IT assessment task, we had to identify the expected outcomes that are needed to achieve the desired goals for the BCC. Then some assessment method indicators were identified to be able to measure the success in reaching the previously identified outcomes. The third step was to identify a set of benchmarks that shape the minimum goals needed. Finally, it was important to plan when and how all this assessment should be conducted and how the results will be used. An initial step in any outcome-driven program is to identify the outcomes to be assessed. The outcomes in the case of educational IT were defined as the technical facilities and network available; the services and updates provided to all stakeholders; the availability of the resources; as well as the ethical and environmental awareness behavior by lab users.

For the facilities, both faculty and students are provided with updated hardware and software facilities in support of their coursework in the school of business as well as in support of their activities on campus (e.g. extracurricular activities). Additionally, faculty and students are provided with the adequate network facilities in support of their coursework in the school of business as well as in support of their activities on campus. As for the services, the faculty and students are provided with qualified lab assistants and the support services that are needed to use effectively the available technology and resources. Moreover, the faculty members at the school of business receive frequent updates on the latest educational technologies newly introduced at BCC and the associated benefits to improve teaching and research.

As for accessibility, BCC facilities are readily accessible and available to faculty and students to meet their computing needs. Moreover, from a behavioral aspect, BCC users demonstrate an understanding of ethical behavior when they are using the BCC computer lab facilities. Additionally, the BCC users demonstrate an understanding and practice of environmental awareness as it relates to the use of BCC facilities. Te'eni (2007) stresses on the importance on supporting diversity of users. Users with different nationalities, ethnic groups, and age groups are much diversified among AUC students. Some of them are executives pursuing their MBA, while others are freshmen teenagers who just joint the university. Satisfaction is one way to measure success by comparing what the students, faculty and staff expected to what they actually experienced. Ginzberg (1981) validates that increasing the user satisfaction should be an essential goal in managing any information system. Ashworth (2010) warns against focusing only on the users and states that employees are equally important.

Naturally, further surveys had to be conducted to analyze the effect of both the move to the new campus as well as the restructuring of the school of business on the user satisfaction. One was conducted a year after the move with three of the biggest extracurricular groups (International Conference in the Global Economy-ICGE, Model United Nations-MUN, and Entrepreneurs' Society-ES) with a total of 117 respondents. The results are demonstrated in figure 4.

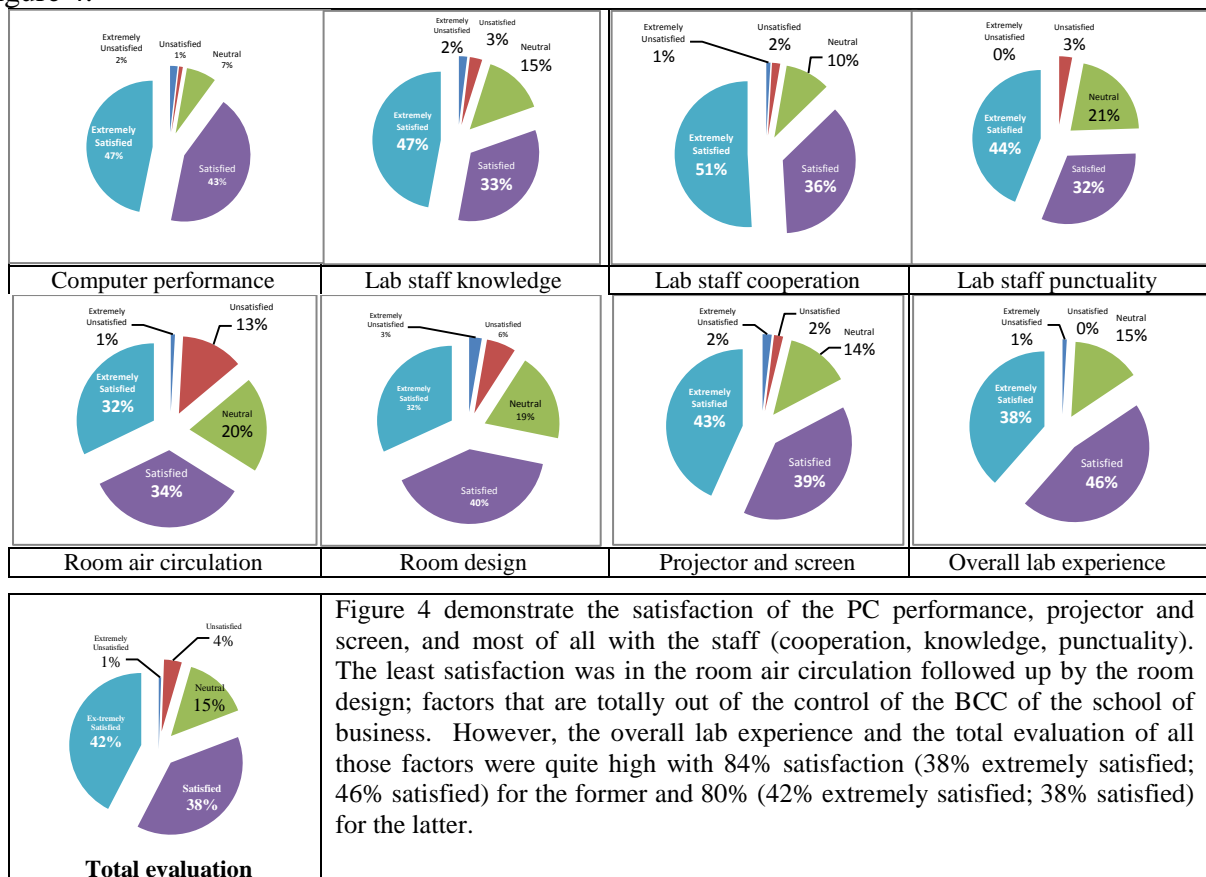


Figure 4: Extracurricular Activities Survey

With respect to the study that was carried out in the academic year 2008-2009, it was found that students favor the labs that are located in the Bartlett plaza area. As can be seen from figure 5, when asked what lab they would use more often had the library labs been the only ones located in the Bartlett plaza (which is currently the case), the library labs were ranked

highest. Interestingly when asked what lab they would use more had all labs been located in the Bartlett plaza (which is currently not the case); the BCC labs were ranked the highest against all other labs on campus.

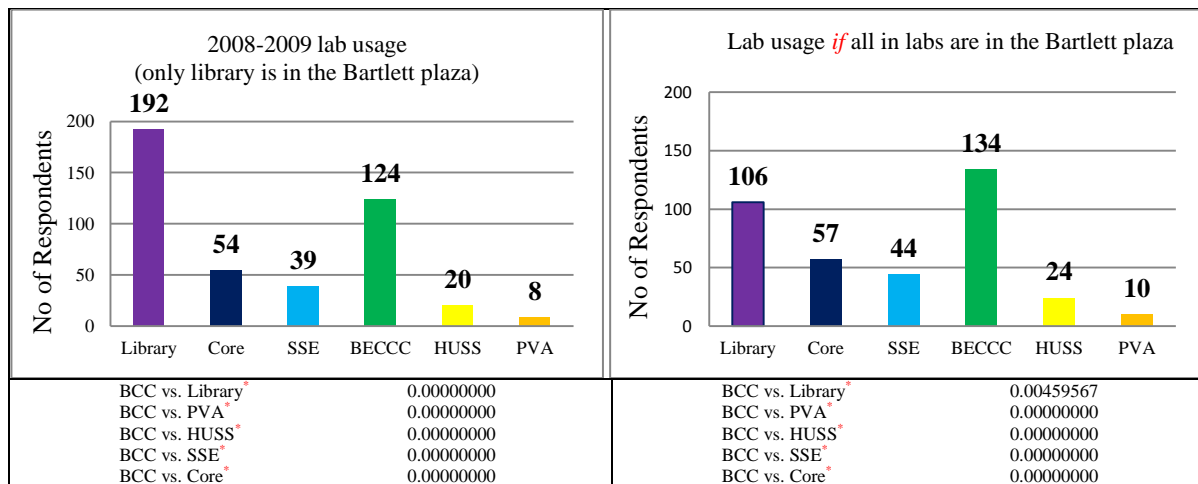


Figure 5: "lab usage if"

If we look at all those labs as different groups, units and entities, we can easily portray AUC as one ecosystem. Interestingly, nevertheless, none of those groups or units competes over profit. In a study by Rateb (2009) a third dimension was proposed to the original Inasiti and Levien's model (2004). This third dimension is the business partners. Rateb argues that when any group is not competing for profit the Inasiti and Levien's model will differ slightly in the sense that the chance that any keystone turns into an aggressor is not probable as it is with the case of the for-profit organizations. As you can see from figure 6, the two dimensions are the complexity of the BCC's relationships with the other units on campus such as the library as well as the uncertainty of those relationships in the ecosystem environment. Complexity of the relationship should be influenced by the current and future aim of the library, the core curriculum, and SSE, HUSS as well as performing and visual arts labs. This in turn should affect other business partners as well as the number of students, faculty, and staff using the lab. Uncertainty is influenced by the limited resources the turbulence or rapid change that is going on as well as insecure environments.

Complexity	H	physical/ value dominator (multiple keystones)	value dominator (keystone)
	L	no ecosystem/ niche	niche/ value dominator (multiple keystones)
		L	H
Uncertainty			

Figure 6: Four Strategies for the Labs
Source: (Rateb, 2009)

With both the uncertainty and complexity of the relationship, a keystone strategy is most appropriate (Rateb, 2009). Both being high in a university is quite rare but if this happens, top university management will play a major role and will adopt the keystone strategy. At

AUC, top management plays an important role to promote the ecosystem approach and hence all educational IT facilities regardless where they are housed. Moreover, when uncertainty is high coupled with a low complexity, a niche strategy will fit better (Rateb, 2009). Competition is not that fierce in a university setting. Usually it is a healthy competition simply because of the value or social aim of those different groups or units is to have the best labs and give the finest service on campus. The funds come from the university administration and they all follow the same policies to allow fair distribution among those different units. In this case those labs will operate as niche players and are responsible for the value creation usually operating under the shadow of a keystone and sometimes operating together as multiple keystones orchestrating the system. When those different entities work in a low uncertainty environment but at the same time the complexity of relationships is quite high, some keystone potentials will start taking on the keystone strategy (Rateb, 2009). On the contrary, when the environment is low in both complexity and uncertainty, usually no strategy is dominant (Rateb, 2009). Nonetheless, with the nature and welfare path of any university setting, a niche strategy could start here. For educational IT at AUC and specifically for all those labs, it is neither a low uncertainty nor a low complexity environment and has not been the case in the past decade. Right before the move to the new campus, and during and after the move, the nature of the relationship alternated among the other three. Consequently, the dominate strategy alternated as well; the most obvious one was the multiple keystones. It should be noted also that one group, unit or entity might take more than one role or strategy in different domains within the same ecosystem (Iansiti and Levien, 2004). So one lab, group, unit or entity could adopt a keystone strategy as teaching labs and adopt a niche strategy as “drop-in” labs.

5. Current Challenges/Problems Facing the Organization

In this last decade, AUC went through major changes twice. The first time was because of the move to the new campus and the second time was because of Egypt’s uprising. A SWOT analysis will be carried out twice to reflect those two phases. However, it is important to note that so many elements were transformed in the second phase some of which were attributed to the uprising and others were attributed to the improvements imposed due to the availability of resources.

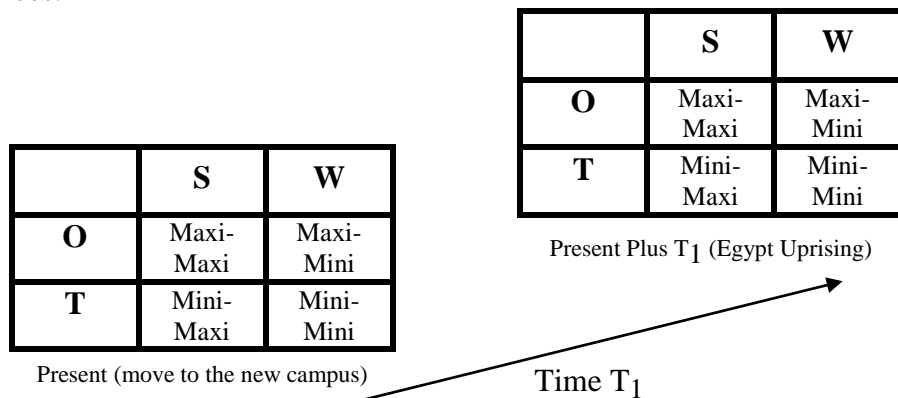


Figure 7: Dynamics of TOWS
Source: (Adapted from Weihrich)

As Weihrich sees it, the TOWS matrix pertains to a certain point in time. Changes take place and several TOWS matrices are needed at different points in time.

5.1 SWOT Analysis (Phase I-Pre Egypt Uprising)

The SWOT analysis of phase I shows that there are many potentials because of the attractive opportunities available at AUC that are coupled with the strong capacity of, and advancements in, educational IT. This is ideal since most of the threats are avoidable and the weaknesses could be easily removed. Handling the situation is very much affected by the ecosystem culture that could reduce threats and increase opportunities. With such layout of strengths, weaknesses, opportunities and threats, there could be a high potential for the strategic planning to gain prominence in the future. The BCC will use the four strategies to sidetrack the threats and the weaknesses. The maxi-maxi, mini-maxi, mini-mini, and maxi-mini are all potential SWOT strategies (figure 7). However, the BCC will focus more on the Mini-Mini strategy *only* at this phase being considered by some to be a defensive strategy and should not be relied upon for long to achieve success (Robson, 1994). The findings of the SWOT analysis is demonstrated in table 1 and the integration with TOWS is presented in table 2.

With respect to the hardware and software facilities at the BCC a comparison was made with what AUC top management considers aspiration peers in the US:

- American University of Beirut
- Brandeis University
- Rice University
- Tufts University (*not AACSB accredited*)
- Villanova University

What seems to be clear is that those universities were considered peer universities to AUC as a whole and not relative to a specific school and department. The authors searched the homepage of those universities to see what facilities they have (excluding Tufts University). From those four universities only one of them has clear information about the hardware and software facility they have and that was Brandeis University. When comparing notes we found out that we have most of the hardware technology they have. For example, their computers are mostly Dual Core processors and so are the BCC computers. At BCC, we also have some Quad Core processors (higher technology). As for the software, the school of business has most of the software these universities possess except for the sophisticated programming applications. With the newly introduced joint major in Management of Information and Communication Technology (MICT) with the department of management and the department of computer science and engineering, it is planned to buy some of this software. On the other hand, the school possesses some selected software that is not available at the counterpart universities such as geographic information systems (GIS), the decision tree, video editing Adobe group and the Eviews economic and finance software.

At the same time, another survey was conducted in the academic year 2009-2010 for all BCC users to evaluate the hardware and software, network, and the people (as users as well as employees). The results of the survey are depicted in table 3 where it is clear that hardly any lab user was dissatisfied with the hardware facilities be it PC, Apple, Printer, scanner, and more.

	Helpful to achieving the objective	Harmful to achieving the objective
Internal origin (attributes to the organization)	<ol style="list-style-type: none"> 1. AUC reputation 2. School reputation and AACSB accreditation 3. Experienced and influential BCC director 4. Highly experienced and professionally skilled BCC staff with collaborative and teamwork traits 5. Self-assessment mechanism for continuous improvement 6. BCC staff friendliness, competence, and reputation 7. BCC staff's technical competence reflects on the students' competence and vice versa 8. Regular training to enrich the experience of BCC team 9. Supportive BCC faculty who are technologically competent and updated 10. Education technology innovation is ongoing 11. Supportive school of business dean with IT background 12. Supportive policies for all student activities on campus 13. Supportive policies for all faculty teaching 14. Policies supporting environmental and social awareness 15. Policies supporting diversity with other departments 16. Flexibility in working hours and free printing 17. Full control of theft 18. Very well-organized (layout of the seating) 19. Good environment 20. Well equipped with the latest educational technology 	<ol style="list-style-type: none"> 1. Limited number of staff in comparison to the number of activities and the staff count of the university 2. Recent restructure of the school of business 3. Major changes and restructuring in human resources 4. Constraints set by the university that limits high caliber staff to stay employed 5. Severe budget cuts (from an average of US\$150K to literally zero in the hardware budget) 6. Location of the new campus regarding late evening hours 7. Location (none in the plaza) 8. Lack of awareness for students 9. Duplex printing (weakness from the students' view) 10. Eating and music is prohibited (students' reaction) 11. Understaffed 12. Very low traffic 13. Internet is too slow 14. No chargeback system when used by non-academics 15. Networking is centralized and not under BCC control 16. Respect the rule of culture 17. Air circulation is inefficient 18. Environmental awareness culture
External origin (attributes to the environment)	<ol style="list-style-type: none"> 1. AUC school of business is well positioned being the only AACSB accredited in Egypt and Africa 2. The booming market and international investments makes many Egyptians interested in accounting, business and economics (school of business majors) 3. Increasing demand for the school 4. Many opportunities to make improvements within the university due to AUC Middle States accreditation 5. It is easy to raise awareness for students 6. There is potential to get more classes to be taught by school of business professors in the labs 7. It is possible to try to relocate some labs e.g. taking two in the Bartlett plaza area 8. It is practical to introduce updated PCs because of the university policies that allow replacement of hardware that are older than 5 years 9. It is feasible to apply a chargeback system to benefit from the non-degree profit making programs that use the BCC labs 10. Domain controller is promised by UACT to overcome networking issues such as Tunnel Guard 11. UACT could technically implement one VLAN to allow sharing 	<ol style="list-style-type: none"> 1. The new campus is located in a suburb of Cairo, a fact that resulted in a trend to avoid late evening hours 2. The location of the new campus is considered insecure resulting in theft, a phenomenon that is slowing down the spreading of a better technology such as laptops 3. Low IT staff salaries relative to the outside market resulted in the loss of key staff 4. AUC community has light knowledge of the computer lab nature and the related impact of the BCC on the university as a whole 5. Lack of defined policies and procedures for most of the activities in the university 6. The move to the new campus was very costly a fact that resulted in severe budget cuts 7. Competition of the library area computer stations 8. Core building computer lab equivalent to popular Wallace labs in the old campus 9. The inconvenience of constant moving around of BCC labs in the second floor 10. Loss of services, overnight shift for students due to overtime restriction rules 11. Seasonal demand with slack resources during the semester break 12. Retention of the key staff is critical 13. PCs are not directly connected to the network causing some software such as the NetOp program not to run properly 14. Different IPs in the same lab does not allow sharing (a problem that was nonexistent in the old campus)

Table 1: SWOT Analysis

Integrating SWOT with TOWS

	Strengths (S)	Weakness (W)
	<ol style="list-style-type: none"> 1. AUC reputation 2. School reputation and AACSB accreditation 3. Experienced and influential BCC director 4. Highly experienced and professionally skilled BCC staff with collaborative and teamwork traits 5. Self-assessment mechanism for continuous improvement 6. BCC staff friendliness, competence, and reputation 7. BCC staff's technical competence reflects on the students' competence and vice versa 8. Regular training to enrich the experience of BCC team 9. Supportive BCC faculty who are technologically competent and updated 10. Education technology innovation is ongoing 11. Supportive school of business dean with IT background 12. Supportive policies for all student activities on campus 13. Supportive policies for all faculty teaching 14. Policies supporting environmental and social awareness 15. Policies supporting diversity with other departments 16. Flexibility in working hours and free printing 17. Full control of theft 18. Very well-organized (layout of the seating) 19. Good environment 20. Well equipped with the latest educational technology 	<ol style="list-style-type: none"> 1. Limited number of staff in comparison to the number of activities and the staff count of the university 2. Recent restructure of the school of business 3. Major changes and restructuring in human resources 4. Constraints set by the university that limits high caliber staff to stay employed 5. Severe budget cuts (from an average of US\$150K to literally zero in the hardware budget) 6. Location of the new campus regarding late evening hours 7. Location (none in the plaza) 8. Lack of awareness for students 9. Duplex printing (weakness from the students' view) 10. Eating and music is prohibited (students' reaction) 11. Understaffed 12. Very low traffic 13. Internet is too slow 14. No chargeback system when used by non-academics 15. Networking is centralized and not under BCC control 16. Respect the rule of culture 17. Air circulation is inefficient 18. Environmental awareness culture
<p>Opportunities</p> <ol style="list-style-type: none"> 1. AUC school of business is well positioned being the only AACSB accredited in Egypt and Africa 2. The booming market and international investments makes many Egyptians interested in accounting, business and economics (school of business majors) 3. Increasing demand for the school 4. Many opportunities to make improvements within the university due to AUC Middle States accreditation 5. It is easy to raise awareness for students 6. There is potential to get more classes to be taught by school of business professors in the labs 7. It is possible to try to relocate some labs e.g. taking two in the Bartlett plaza area 8. It is practical to introduce updated PCs because of the university policies that allow replacement of hardware that are older than 5 years 9. It is feasible to apply a chargeback system to benefit from the non-degree profit making programs that use the BCC labs 10. Domain controller is promised by UACT to overcome networking issues such as Tunnel Guard 11. UACT could technically implement one VLAN to allow sharing 	<p>SO Strategy</p> <ol style="list-style-type: none"> 1. Stronger leadership and supportive dean can enhance opportunities to grow 2. The printing policies, good environment, friendliness and flexibility in time, could be a tool to spread awareness 3. Ongoing policy of offering the latest versions and updates in the software like Photoshop with the up-to date personal computers can make difference and will be a competitive advantage 4. With the change of the location of some of the BCC labs, hopefully to the Bartlett plaza, an increase in the traffic on the labs with its good environment and management is expected 5. The abilities of the lab assistants could be used to give free training on any updates in the newly introduced technology 	<p>WO Strategy</p> <ol style="list-style-type: none"> 1. The solution to problem of the location can be easily given through the change of some labs to the Bartlett plaza area 2. By promoting the environmental awareness culture and convincing all the labs to use the duplicated printing system, it will not make a problem for BCC labs 3. Coordinating and pressuring UACT to offer the domain sharing strategy to overcome almost 90% of the network issues 4. Budget cuts could be smoothed with revenue generating programs to pay for using the facilities/ services of BCC 5. Centralized IT unit could help in sharing expenses and experiences
<p>Threats</p> <ol style="list-style-type: none"> 1. The new campus is located in a suburb of Cairo, a fact that resulted in a trend to avoid late evening hours 2. The location of the new campus is considered insecure resulting in theft, a phenomenon that is slowing down the spreading of a better technology such as laptops 3. Low IT staff salaries relative to the outside market resulted in the loss of key staff 4. AUC community has light knowledge of the computer lab nature and the related impact of the BCC on the university as a whole 5. Lack of defined policies and procedures for most of the activities in the university 6. The move to the new campus was very costly a fact that resulted in severe budget cuts 7. Competition of the library area computer stations 8. Core building computer lab equivalent to popular Wallace labs in the old campus 9. The inconvenience of constant moving around of BCC labs in the second floor 10. Loss of services, overnight shift for students due to overtime restriction rules 11. Seasonal demand with slack resources during the semester break 12. Retention of the key staff is critical 13. PCs are not directly connected to the network causing some software such as the NetOp program not to run properly 14. Different IPs in the same lab does not allow sharing (a problem that was nonexistent in the old campus) 	<p>ST Strategy</p> <ol style="list-style-type: none"> 1. With the flexibility in time, free printing and availability of places, BCC labs could easily have competitive advantage over others 2. Having good employees will increase the service in the different labs i.e. helping-out some students with how to log on and use the different software etc. 3. Continuous updating and training the lab assistants to continue the standard of services offered 4. Continue motivating the BCC staff by offering rewards and recognizing the best employee on a semester basis 	<p>WT Strategy</p> <ol style="list-style-type: none"> 1. The location is a weak point, which can be strengthened through moving to the Bartlett plaza area 2. The severe budget cuts are another weak point that could be gradually strengthened by the support that is accompanied with the change in top management (supportive dean) 3. The network issue is one of the major problems that should be further pressured by top management to expedite solutions

Table 2: Integrating SWOT

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	NA	
PC	31	29	14	1	0	7	82
Apple Computers	21	18	16	7	1	18	81
BW Printers	21	30	13	4	0	13	81
Color Ink Jet Printers	8	20	18	4	1	30	81
Color Laser Printers	7	19	15	5	2	32	80
Scanners	12	13	17	4	1	34	81
Plotters	5	9	19	2	0	44	79
Smart Boards	18	17	15	7	0	22	79
Datashows	15	27	16	4	0	17	79

Table 3: Level of Satisfaction with Hardware

Figure 8 displays the pie charts of the satisfaction level. Further analysis shows that the *very satisfied* computer users were 38% and 26% for PCs and Apple computers respectively while the *satisfied* computer user was 35% and 22% for PCs and Apple computers. For printers the very satisfied ranged from 6% to 26% and the satisfied ranged from 11% to 40%.

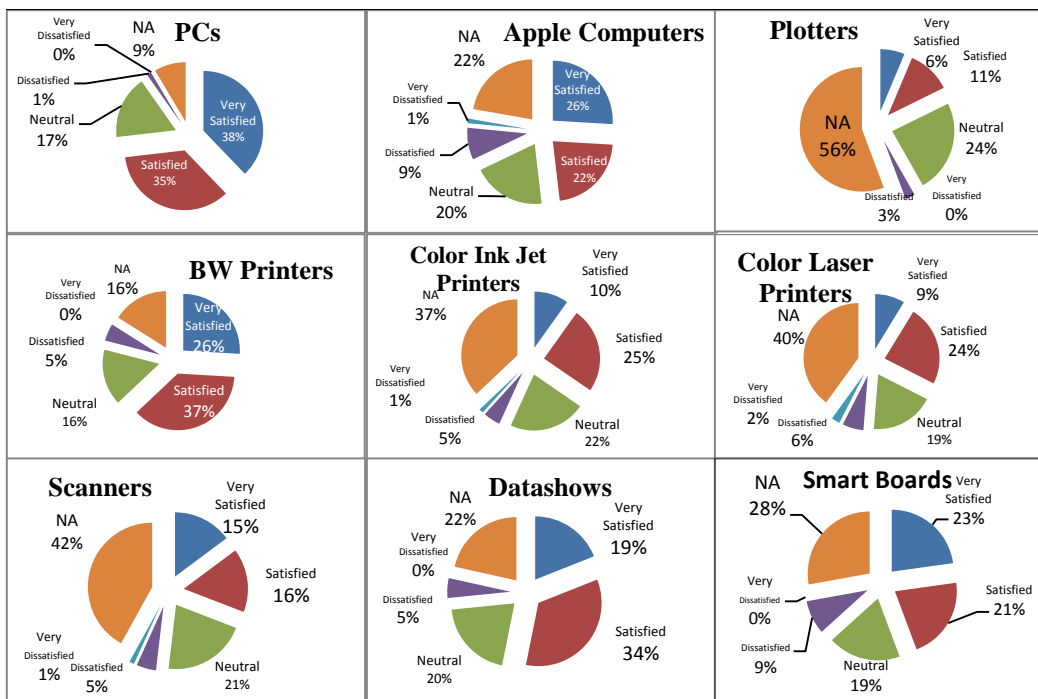


Figure 8: Level of Satisfaction with Hardware

Another way to analyze the data is by grouping the “very satisfied” and “satisfied” together along with the “NA” and “neutral”; or by ignoring the NA or by ignoring the NA and neutral:

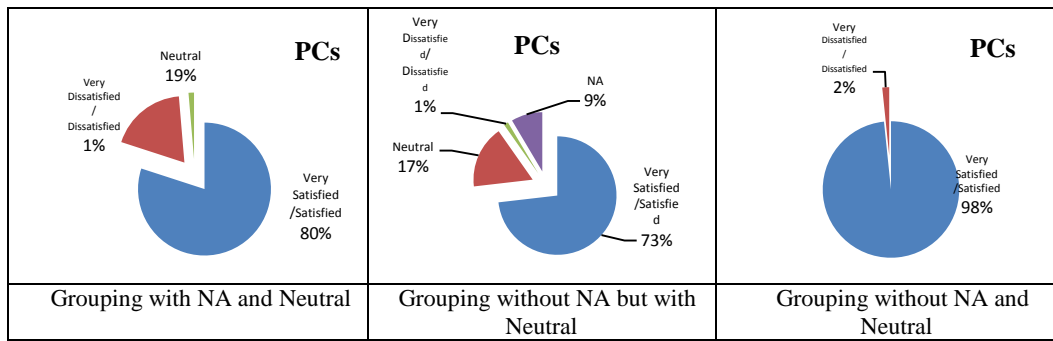


Figure 9: Grouping Degrees of Satisfaction versus Dissatisfaction of PCs

Based on figure 9, one can deduce that the dissatisfaction level ranged between 1% and 2%. The satisfaction level was 73% and NA 9% while neutral was 17%. If one totally ignores the NA (those who do not use PCs), the dissatisfaction level is 1% while the satisfaction level is raised to 80%. On the other hand, the satisfaction level is 98% and the dissatisfaction level 2% if neutral along with the NA is ignored. Ignoring the non-users, (middle) is important because the satisfaction versus dissatisfaction percentage makes more sense. Ignoring the neutral (right) could be also useful at times were it neither fits the satisfied nor the dissatisfied user. The same analysis goes for the rest of the hardware items as follows:

Based on figure 10, the least dissatisfaction is with PCs, which is only 2% and the most was the color laser with 21%. This gives a weighted average dissatisfaction of 12%. It is important to note that if one manages to implement the plan of decreasing Apple computers around 40 per annum and buying PCs, the school of business will end up with a dissatisfaction rate of 10% in the first year; 8% dissatisfaction rate in the following year and only 6% in the third and last year. This is assuming the simplest and easiest scenario of changing nothing in the BCC except decreasing Apple computers and increasing PCs.

Figure 11 displays the equipment and dissatisfaction level changes across the three-year plan. Accordingly, the data is categorized according to the weighted dissatisfaction of 3%, 15%, 17%, and 21%. In the current year graph (top right) the 3% dissatisfaction level account for 51% of the equipment (namely PCs, printers, and datashows) while the 21% dissatisfaction level account to 0% for the laser color printer (note that it is not 0% in the literal sense because there is one laser color printer from a total of 307 equipments). By the end of the three-year plan (bottom right), one sees that the 3% dissatisfaction level accounts for 77% of the equipment in the BCC versus the 51% of this current year (assuming the worse scenario case where nothing else changes or improves). In other words, by simply decreasing apple computers 40 per annum (at the same time increasing PCs with the same amount) we get 77% of the BCC equipment with a dissatisfaction of only 3% after three years only.

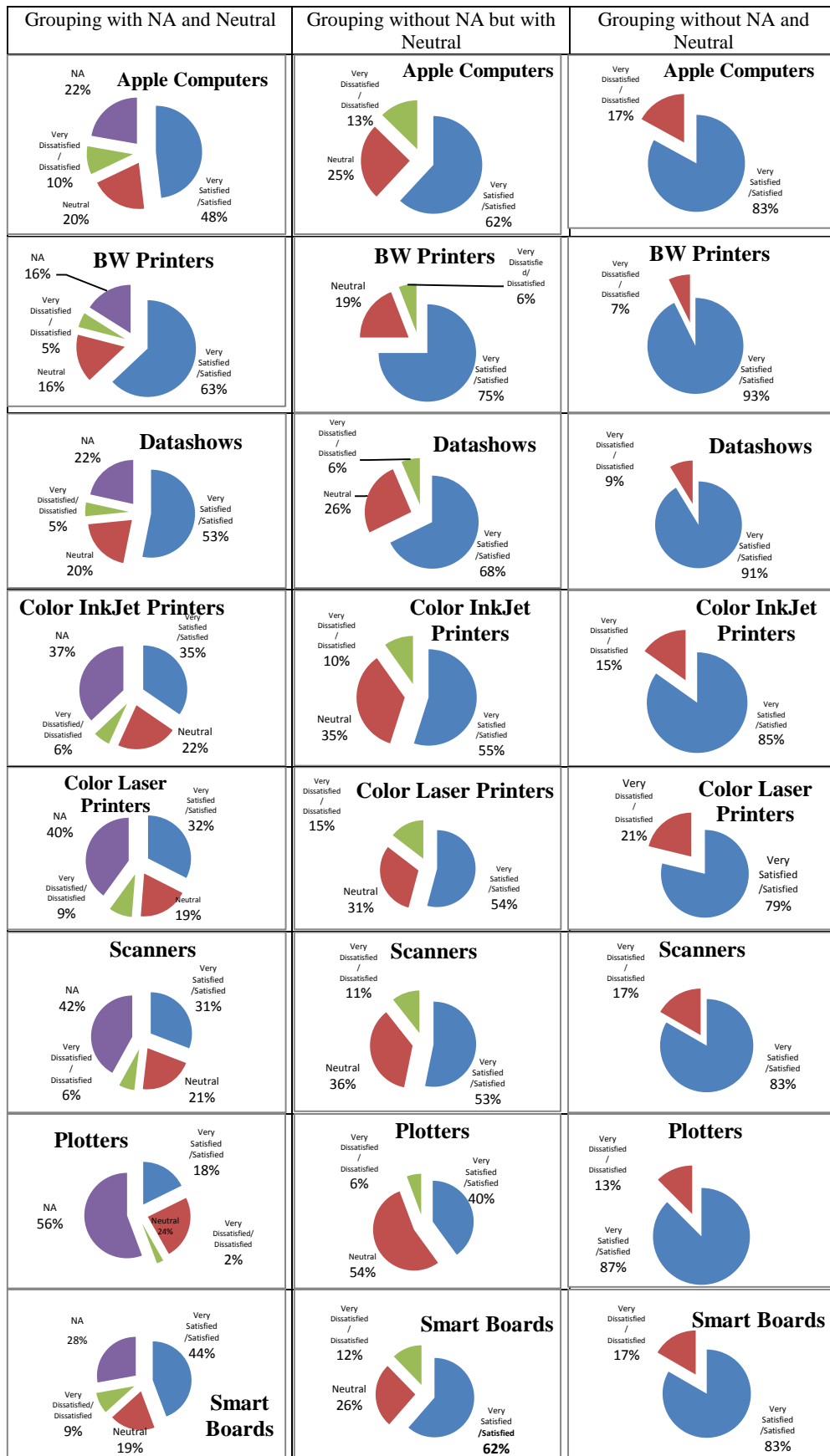


Figure 10: Grouping Very Satisfied with Satisfied versus Very Dissatisfied with Dissatisfied for Hardware

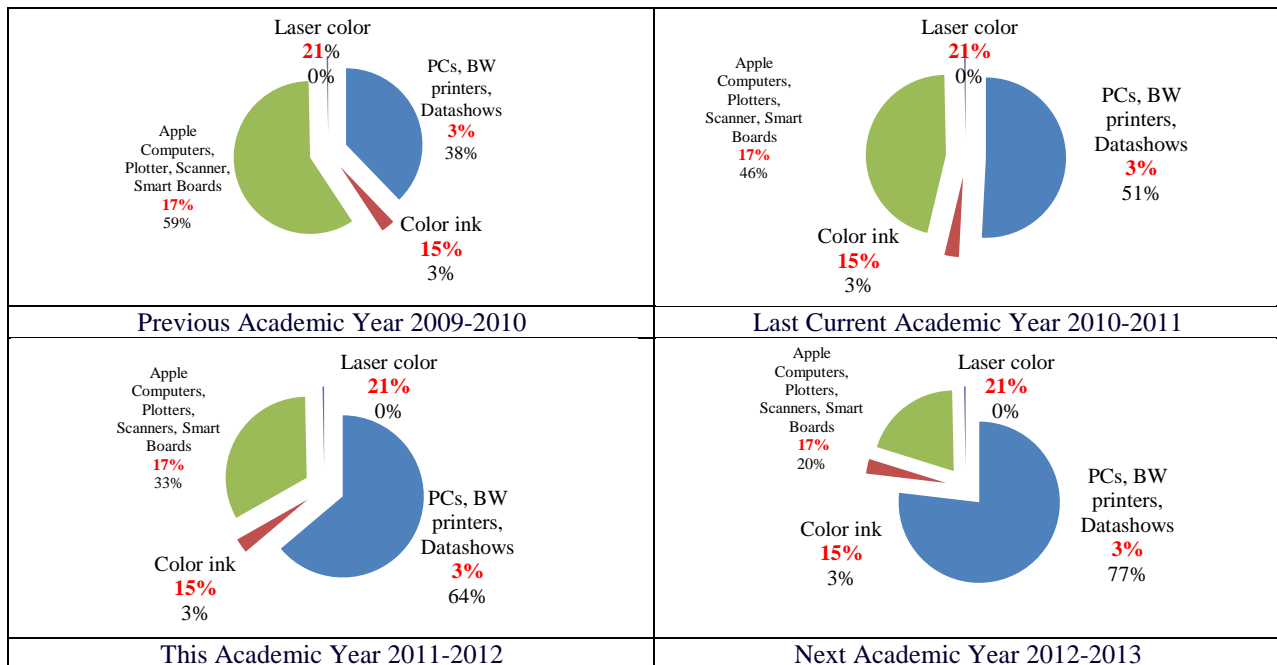


Figure 11: The 3-Year Plan for Improving the Hardware Satisfaction Level

When analyzing the data from another perspective; however, still using the weighted mean technique, the same conclusion was reached. In this case, the grouping of hardware included PCs, printers, and others (media shows, scanners, and the smart boards). Although the satisfaction level is only 70%, the dissatisfaction level is as low as 7% because 23% rate their satisfaction as neutral as shown in figure 12.

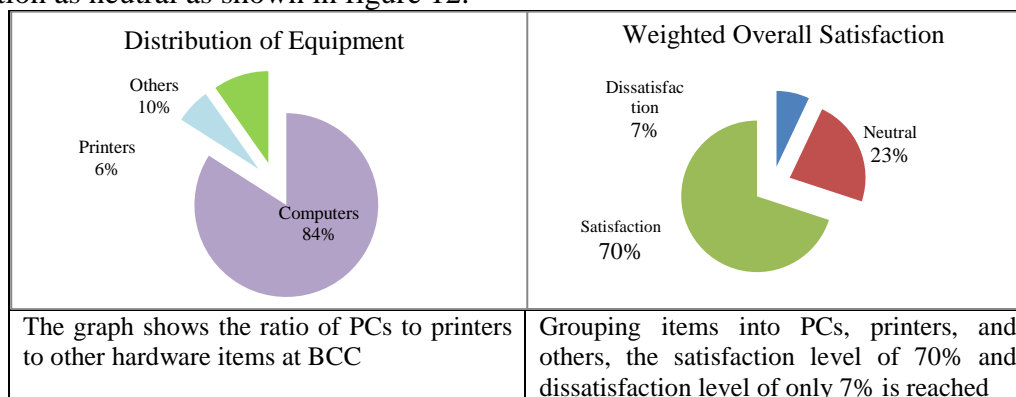


Figure 12: Profile of Hardware and Satisfaction Levels

During spring, 2010 semester three different student activity groups used the BCC:

- International Conference on the Global Economy-ICGE (school of business)
- Entrepreneur Society-ES (school of business)
- Model United Nations-MUN (school of humanities and social sciences)

Those groups reserved the labs mostly during the weekend, the duration of which never exceeded one week. At that time, they were requested to fill out a hardcopy questionnaire. The response rate for ICGE (school of business) was (70 out of 100) 70%; for ES (school of business), was (35 out the 50) 70% and for MUN (school of humanities and social sciences) was (5 out of 15) 33%. The overall (includes hardware, room design and AC, as well as staff) level of satisfaction is shown in figure 13

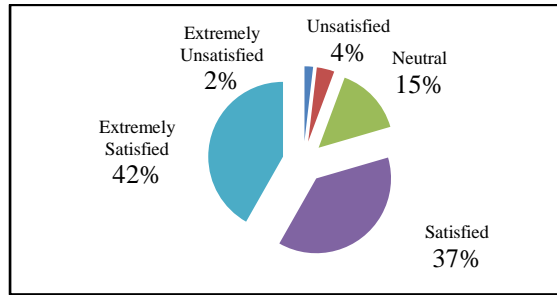


Figure 13: ICGE, ES, MUN Survey (student activities)

The dissatisfaction level was 3% for computer performance and 4% for projector and screen. Figure 14 displays the satisfaction levels for the computer equipment performance as well as the projectors and screens.

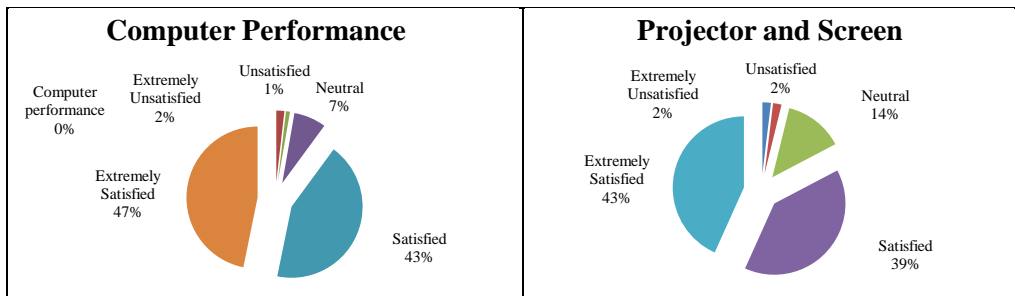


Figure 14: Level of Satisfaction for Hardware

As for the level of satisfaction with software, one can see from figure 15 shows that hardly any lab user was dissatisfied with the software facilities. Table 4 shows that the level of satisfaction with the software at BCC is quite high. The PC level of satisfaction with the software is higher than that of Apple computers.

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	NA	
PC Software	29	30	15	1	0	7	82
Apple Computers Software	19	14	21	6	1	20	81

Table 4: Level of Satisfaction for Software

Figure 15 displays the same data in graphical format where the percentages give a clearer picture and allows for easy comparison. The level of dissatisfaction totals 1% for PC software and 8% for Apple software. Using the weighted average concept, the result is an average dissatisfaction of 12% when taking into consideration the amount of PCs versus Apple available.

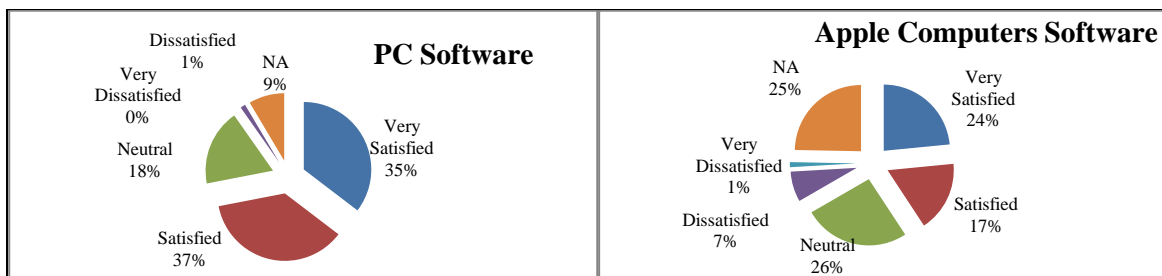


Figure 15: Level of Satisfaction with Software

As for the network, the results were quite promising. Table 5 displays assessment findings.

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	NA	
Internet Access	29	27	12	3	3	7	81
Internet Speed	26	28	12	6	1	7	80

Table 5: Level of Satisfaction with Internet Connectivity

The total satisfaction (very satisfied and satisfied) accounted for 69% and 67% for Internet access and Internet speed respectively. This is considered a great improvement since according to a study conducted the previous year by students, Internet and network were the most problematic area at BCC (figure 16).

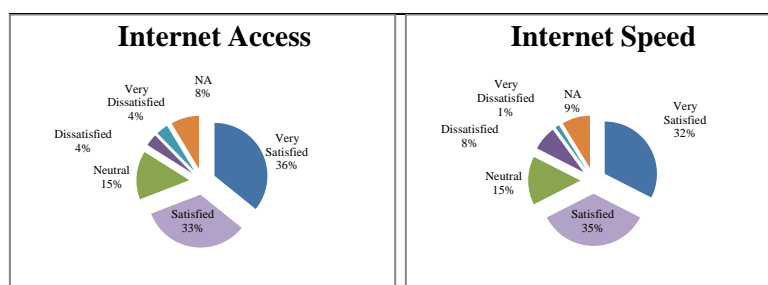


Figure 16: Level of Satisfaction with Internet Connectivity

With respect to staff and services, the findings were that none of the labs was left unstaffed during operating hours; the average training hours per staff was 70+ hours, which covered the technical, as well as the nontechnical managerial training; and all school of business classes that needed labs were conducted in BCC labs (table 6).

Semester/School	Regular Classes		Irregular Classes	
	School of Business	Others	School of Business	Other
Fall 2009	29	6	31	10
Spring 2010	25	6	78	36
Summer 2010	7	0	11	0
Fall 2010	38	12	38	14

Table 6: Classes Scheduled at BCC

All school of business events and conferences were supported by BCC (AIESEC, AYB, CMUN, ES, FYE, Glow, Help, ICGE, MAL, MUN, OSD, SU, VIA) as per table 7.

Semester	Student Activity
Fall 2009	15
Spring 2010	31
Fall 2010	19

Table 7: Student Activity Events Supported by BCC

With respect to BCC staff cooperation, the rate was 5% and 6% for very dissatisfied and dissatisfied respectively. For BCC knowledge, the group that was very dissatisfied was only 4% and the dissatisfied were 6%. For BCC punctuality, none was very dissatisfied and only 7% dissatisfied. Figure 17 displays the results of the BCC staff evaluation from the institutional research survey attained from the faculty and students.

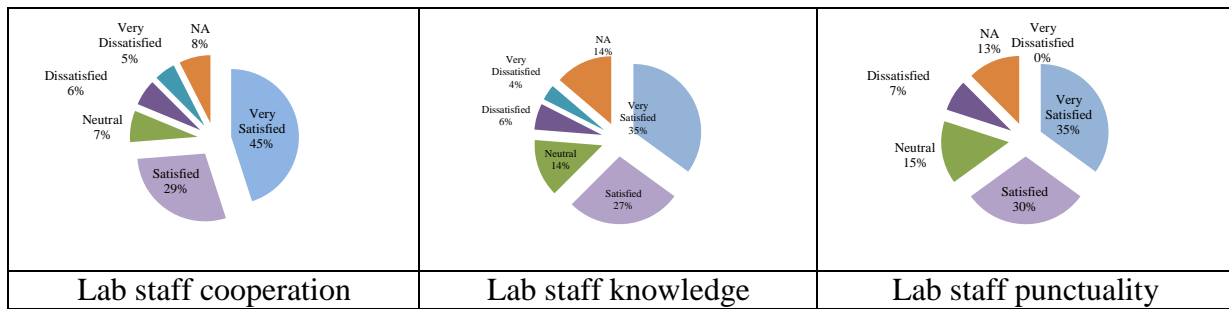


Figure 17: BCC Staff Evaluation

The student activity results were scored highest with the very dissatisfied rate ranging from zero to 1% to 2% for BCC staff punctuality, cooperation and knowledge. Figure 18 displays the results of the BCC staff evaluation from student activities.

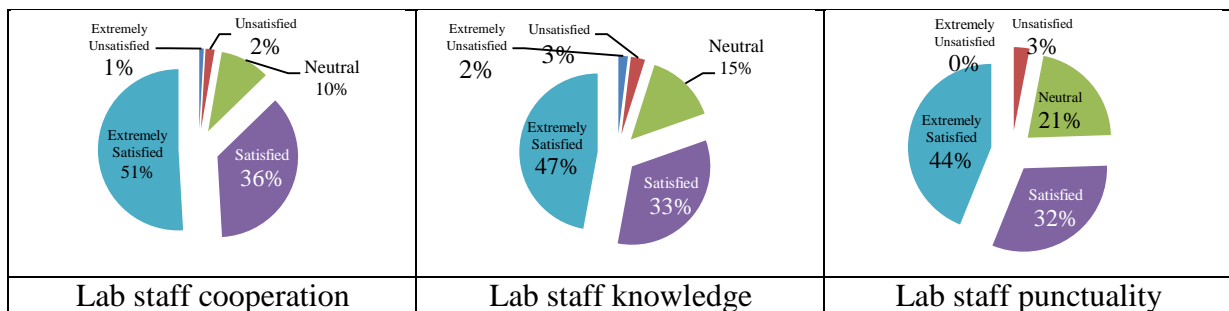


Figure 18: Student Activity BCC Staff Evaluation

Moreover, the school of business has the highest evaluation rate when compared to the average evaluation of other AUC labs of other schools. For the fall 2009, 71% of the students who completed the evaluation at the school of business versus only 51% and 61% at sciences and engineering; and, humanities and social sciences respectively. For the spring 2010 semester, the rates were 74.59%, 47%, and 63% for business; sciences and engineering; and, humanities and social sciences respectively.

With respect to BCC users, they demonstrate an understanding of ethical behavior when using the BCC computer lab facilities. At least 90% of faculty, students, and staff observed behave ethically and in compliance with AUC academic integrity published policy (significant improvement was noticed). Since all rules and policies are being closely monitored, there is no need to make changes in those rules as the students comply with the policies. BCC users also demonstrate an understanding and practice of environmental awareness as it relates to the use of BCC facilities. For example, paper is properly trashed in the “paper only” bins and all paper is duplex printed.

5.2 SWOT Analysis (Phase II-Post Egypt Uprising)

Egypt’s uprising was as a turning point to track down changes that took place partly attributable to it and partly attributable to the strategies set to overcome challenges, threats and weaknesses. Table 8 demonstrates the differences when compared to phase I (pre-Egypt uprising). Tables 9 and 10 demonstrate the SWOT analysis and the integration with TOWS post Egypt Uprising.

Strengths	Weaknesses
<i>Compared to the SWOT analysis for phase I, all existing strengths still prevail</i>	<i>Compared to the SWOT analysis for phase I, the following weaknesses no more exist in phase II</i> – Major changes in human resources

	<ul style="list-style-type: none"> - Constraints set by the university that limits high caliber staff to stay employed - Severe budget cuts - Location (none in the Bartlett plaza) - Lack of awareness for students - Internet is too slow - Networking is centralized and is not under the control of BCC - Environmental awareness culture
Opportunities	Threats
<p><i>Compared to the SWOT analysis for phase I, the following weaknesses no more exist in phase II</i></p> <ul style="list-style-type: none"> - With Egypt's uprising, the market is not booming anymore but the school of business still has the highest demand on its majors (over 50% of AUC students) - There is potential to get more classes to be taught by AUC professors in the labs (almost fully booked) - Relocation of labs in the Bartlett plaza area - Domain controller by UACT to overcome networking issues such as Tunnel Guard fulfilled - UACT implemented one VLAN to allow sharing 	<p><i>Compared to the SWOT analysis for phase I, the following weaknesses no more exist in phase II</i></p> <ul style="list-style-type: none"> - Competition of the library Plaza area computer stations (lab already moved to the Bartlett plaza area) - Low computer staff salaries relative to the outside market resulted in the loss of key staff (not an issue after human resources did major modifications in salaries) - Retention of the key staff is critical (not an issue after human resources did major modifications in salaries) - Computers are not directly connected to the network causing some software such as the NetOp program not to run properly (fixed) - Different IPs in the same lab does not allow sharing (fixed)

Table 8: Comparison between SWOT Analysis of Phases I and II

	Helpful to achieving the objective	Harmful to achieving the objective
Internal origin (attributes to the organization)	<ol style="list-style-type: none"> 1. AUC reputation 2. School reputation and AACSB accreditation of business programs 3. Well connected, experienced and influential BCC leader 4. Highly experienced and professionally skilled BCC staff with collaborative and teamwork traits 5. Self assessment mechanism for continuous improvement 6. BCC staff friendliness, competence, and reputation 7. BCC staff's technical competence 8. Ongoing training process 9. Supportive BCC faculty technologically competent 10. Education technology innovation is ongoing 11. Supportive school of business dean with IT background 12. Supportive policies for all student activities on campus 13. Supportive policies for all faculty teaching 14. Policies supporting environmental and social awareness 15. Policies supporting diversity with other departments 16. Flexibility in working hours and free printing 17. Full control of theft 18. Very well-organized (layout of the seating) 19. Good environment 20. Well equipped with the latest educational technology 21. Accreditation pressures and the AACSB standards 22. Excellent IT centralized support 	<ol style="list-style-type: none"> 1. Limited number of staff in comparison to the number of activities and the staff count of AUC 2. Location of the new campus with respect to late evening hours 3. Duplex printing (weakness from the students' point of view) 4. Very low traffic 5. Eating and music is prohibited (weakness from the students' point of view) 6. No chargeback system when used by non academic programs 7. Understaffed 8. Respect the rule culture 9. Air circulation is inefficient

External origin (attributed to the environment)	<ol style="list-style-type: none"> 1. AUC school of business is well positioned being the only AACSB accredited in Egypt and Africa 2. With Egypt's uprising, the market is not booming anymore but the school of business still has the highest demand on its majors (over 50% of AUC students) 3. Many opportunities to make improvements within the university due to AUC Middle States accreditation 4. It is easy to raise awareness for students 5. AACSB accreditation makes the school of business at AUC fast growing with great interest and high demand from the students the fact that will lead to concentrations being turned into majors and departments 6. It is practical to introduce updated PCs because of the university policies that allow replacement of hardware that are older than 5 years 7. It is feasible to apply a chargeback system to benefit from the non-degree profit making programs that use the BCC labs 	<ol style="list-style-type: none"> 1. The new campus is located in not so quite an inhibited area off Cairo, a fact that resulted in a trend to avoid late evening hours 2. Insecurity and economic instability because of Egypt's uprising 3. The university community has light knowledge of the computer lab nature and the related impact of the BCC on the University as a whole; 4. Lack of defined policies and procedures for most of the activities in the University; 5. The move to the new campus was very costly a fact that resulted in severe budget cuts. 6. Trend to avoid late evening hours in an insecure campus has escalated due to the insecurity caused by the Egyptian revolution. 7. The location of the new campus is considered insecure resulting in theft, a phenomenon that is slowing down the spreading of a better technology such as laptops 8. Core Building computer lab equivalent to the popular Wallace Labs in the old campus 9. The inconvenience of constant moving around of BCC labs in the second floor 10. Loss of services – overnight shift for students due to overtime restriction rules 11. Seasonal demand with slack resources during the semester break.
---	---	--

Table 9: SWOT Analysis

Integrating SWOT with TOWS

	Strengths (S)	Weakness (W)
<p>Opportunities</p> <ol style="list-style-type: none"> AUC school of business is well positioned being the only AACSB accredited school in Egypt and Africa With Egypt uprising, the market is not booming anymore but the school of business has the highest demand for its majors (over 50% of AUC students) Lots of opportunities to make improvements within the University due to the overall university accreditation It is easy to raise awareness for students AACSB accreditation makes AUC school of business fast growing with great interest and high demand from the students the fact that will lead to concentrations being turned into majors and departments It is practical to introduce updated computers because of the university policies that allow replacement of hardware older than 5 years It is feasible to apply a chargeback system to benefit from the non-degree profit making programs the use the BCC labs 	<p>SO Strategy</p> <ol style="list-style-type: none"> Stronger leadership and supportive dean can enhance opportunities to grow The printing policies, good environment, friendliness and flexibility in time, could be a tool to spread awareness Ongoing policy of offering the latest versions and updates in the software like Second Life with up-to date personal computers can make a difference and will be a competitive advantage With the change of the location of some of the BCC labs to the plaza increases the traffic on the labs with its good environment and management The abilities of the lab assistants could be used to give free training on any updates in the newly introduced technology 	<p>WO Strategy</p> <ol style="list-style-type: none"> The solution to the problem of the location can be easily solved through changing the location of some labs to the Bartlett plaza (done) By promoting the environmental awareness culture and by convincing all the other labs to use the duplicated printing system, will overcome the problem for BCC labs Coordinating and pressuring UACT to offer the domain sharing strategy to overcome almost 90% of the network issues (done) Budget cuts could be smoothed with revenue generating programs to pay for using the facilities/ services of BCC Centralized IT unit could help in sharing expenses and experiences (done)
<p>Threats</p> <ol style="list-style-type: none"> The new campus is located in not so quite an inhibited area of Cairo, a fact that resulted in a trend to avoid late evening hours Insecurity and economic instability because of Egypt's uprising AUC has light knowledge of the computer lab nature and the related impact of BCC on the university Lack of defined policies and procedures for most of the activities in the university The move to the new campus was very costly a fact that resulted in severe budget cuts The tendency to avoid late evening hours in an insecure campus has escalated due to the insecurity caused by Egypt's uprising The location of the new campus is considered insecure resulting in theft, a phenomenon that is slowing down the spreading of a better technology such as laptops Core Building computer lab equivalent to the popular Wallace Labs in the old campus The inconvenience of constant moving around of BCC labs in the second floor Loss of services, overnight shift for students due to overtime restriction rules Seasonal demand with slack resources during the semester break 	<p>ST Strategy</p> <ol style="list-style-type: none"> With the flexibility in time, free printing and availability of places, BCC labs could easily have a competitive advantage over others Having good employees, will increase the service in the different labs i.e. helping-out some students with how to log on and use the different software etc. Continuous updating and training the lab assistants to be able to continue the standard of services offered Continue motivating the BCC staff by offering rewards and recognizing the best employee on a semester basis 	<p>WT Strategy</p> <ol style="list-style-type: none"> The location is a weak point which can be strengthened through moving to the plaza area (done) The severe budget cuts are another weak point that could be gradually strengthened by the support that is accompanied with the change in top management (supportive newly appointed dean) The network issue is one of the major problems that should be further pressured by top management to expedite solutions (done)

Table 10: Integrating SWOT

6. Conclusion of the SWOT Analysis and TOWS Matrix (Phase II)

According to Robson (1994), one of the strategies of the SWOT analysis uses the strength to redirect the threat. It is amazing to note how many of the weaknesses were overcome by using the strengths and opportunities of BCC. For example, the human resource changes were reflective positively in transparency, equality, and accordingly salary adjustments. This has greatly motivated the BCC staff and eliminated the turnover possibility of high caliber staff. The restructuring of the school of business was benefitting in so many ways; for example-shared space forced AUC to construct provisional areas in terraces and unused plaza area. This has led, after severe negotiations, to the relocation of two BCC labs, one of which moved to the Bartlett plaza. Now the Bartlett plaza lab is always overcrowded with students as was expected from our study about lab location preferences (awareness issue). As for the centralization of the networking and IT support, again after severe negotiations, it turned out to be ideal.

All networking issues ended up being solved and were turned into opportunities if not strengths; moreover, the services and support received were more than excellent, a trait that was not available so superbly in the past. As for budget cuts, it was turned around to become a “*strength*” given that we have to share resources with the centralized IT; one of which was the purchase of a land for Second Life to be used as a prototype in teaching IS courses in the school for the first time during fall 2011. This was changed into making full use of the expertise of the centralized IT staff who gave useful and effective training and continuous services simply for that matter. Managing educational information technology transformation at the school of business has been a challenge with the move to the new campus however with the collaboration of different constituencies and the adaptation to the growing needs of students, faculty, the outcome has been positively assessed, and efficiency was improved.

References

- Ashworth, W, “Qualitative Analysis: What Makes a Company Great?”
<http://www.investopedia.com/articles/fundamental-analysis/10/qualitative-analysis-intangibles-affect-stock-price.asp>, (accessed May 23, 2010).
- Business Computer Center, <http://www.aucegypt.edu/business/bcc/pages/home.aspx>, (accessed November 2011).
- Business Computer Center, <http://www.aucegypt.edu/team/pages/default.aspx>, (accessed November 2011).
- Business Computer Center, <http://www.aucegypt.edu/business/bcc/labs/pages/home.aspx>, (accessed November 2011).
- EERA, <http://www.eera-ecer.eu/networks/network9/>, (accessed May 9, 2010).
- Ginzberg, M. J (1981) “Early Diagnosis of MIS Implementation Failure”, *Management Science*, (27) 4, pp. 459-478.
- Heinz W, “The TOWS Matrix- A Tool for Situational Analysis,” *Long Range Planning*, (accessed November 2011).
- Hoerner, J. A, “Sustainable Solutions to Current Crises: Recommendations for the New Administration.” *Redefining Progress the Nature of Economics*,
www.rprogress.org/sustainable_economics/presidential_essay.html, (accessed November 4, 2008).
- Institutional Research, the American University in Cairo, 2010.
- Iansiti, M. and Levien R (2004) *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*, Boston: Harvard Business School Press.
- Iansiti, M. and Levien R (2004) “Strategy as Ecology,” *Harvard Business Review*, March.
- Kizlik, B, “Measurement, Assessment, and Evaluation in Education,”
<http://www.adprima.com/measurement.htm>, Updated January 6, 2010.
- Leavitt, H. J (1965) “Applied Organizational Change in Industry: Structural Technological and Humanistic Approaches”, in March, J.G (eds.) *Handbook of Organizations*, Chicago: Rand-McNally, pp. 114-117.
- Maha A (2010) “A Brief History of AUC Technology,” unpublished paper.

- Martin, J (2003) "COBIT: A Tool to Manage Information Ecology", *Information Systems Control Journal*, 3.
- Rateb, D. F (2009) "Technological and Humanistic Approaches in the Choice of Ecosystem Strategy and the Management of Information Ecosystems," unpublished paper.
- Robson, W (1994) *Strategic Management and Information Systems, an Integrated Approach*, London: Pitman Publishing.
- Roch, J. A and Behling, R (2007) "Managing higher education information technology professionals for maximum productivity," *International Journal of Management in Education*, (1) 4.
- Te'eni, D. et al (2007) *Human Computer Interaction: Developing Effective Organization Information Systems*, New York: Wiley.
- The American University in Cairo, <http://aucegypt.edu>, (accessed November 2011).
- The American University in Cairo, <http://www.aucegypt.edu/aboutauc/HistoryandMission/Pages/history.aspx>, (accessed December 2011).
- "Using the TOWS Matrix, Developing strategic options from an external-internal analysis", http://www.mindtools.com/pages/article/newSTR_89.htm, (accessed November 2011).