



*Ministry of Higher Education in Afghanistan*



*Technische Universität Berlin*

**ZiiK-Report Nr. 32**

**Conference "Information Technology for Higher  
Education in Afghanistan"  
Part VIII**

**18. - 20.12.2012**

**Kabul/Afghanistan  
Ministry of Higher Education**





## ***Organized by***

IT department of the Ministry of Higher Education (MoHE) and



Center for international and intercultural Communication (ZiiK)  
at the Technische Universität Berlin



## ***Funding***



Auswärtiges Amt

**DAAD**

Deutscher Akademischer Austausch Dienst  
German Academic Exchange Service

## ***Imprint***

Editors: Dr. Nazir Peroz, Daniel Tippmann

Minute writers: Tilman Schieber, Ralph Magnus, Chi-Thanh Christopher Nguyen

Photographs: Team of the MoHE and Team of ZiiK

Technische Universität Berlin

Center for international and intercultural Communication (ZiiK)

Faculty of Electrical Engineering and Computer Science

Fraunhoferstr. 33-36, 10587 Berlin

[www.tu-berlin.de/ziik](http://www.tu-berlin.de/ziik)

Berlin, January 2013

ISSN 169-3660

## Introduction

This conference was the eighth in a series of conferences on Information Technology (IT) in Afghanistan which have been conducted on an annual basis since 2005. It has been hosted from 18. until 20.12.2012 at the Ministry of Higher Education (MoHE) with technical assistance of the Center for international and intercultural Communication (ZiiK) of the Technical University Berlin (TU Berlin), with funding from the German Federal Foreign Office and with support from the German Academic Exchange Service (DAAD).

The topic of this IT conference was “**Current situation and perspectives**”.

Among the guests of the conference were representatives from Afghan ministries, from



the Germany Embassy and other international Embassies in Kabul, presidents from public and private Afghan universities, the IT advisers of the Afghan universities, master lecturers and students from the TU Berlin, computer science lecturers and experts in the area of IT as well as international guests like representatives from GOs, NGOs and other universities. In total, more than 200 persons participated in the conference.

The opening and welcome of the conference was broadcasted by several Afghan TV stations.

During the second day of the conference, the invited guests, experts, Afghan computer science lecturers, Master graduates and students from TU Berlin held three workshops. These workshops had the topics of **IT education** with focus on curriculum development, training and distance learning, **secure IT infrastructures** focusing on university networks, Open Source software and the Afghanistan Research and Education Network (AFREN) and **IT in administrative processes** with focus on organization and management for the administration and the Higher Education Management Information System (HEMIS).

On the third day of the conference, the invited guests discussed about the results of the workshops and made proposals for their realization and for making these processes transparent and sustainable. As attachment, there is a collection of additional photos from the three conference days.

**First day: Tuesday, December 18<sup>th</sup>, 2012**

## **Welcome and Opening**



**Mr. Noorbakhsh** – Spokesman of the Ministry of Higher Education welcomed all contributors and guests to the 8<sup>th</sup> conference of Information Technology for Higher Education in Afghanistan. He expressed his delight that this conference will offer the opportunity to get together and talk about the future of Information Technology in Afghanistan. The conference opened with the recitation of a few verses of the Holy Quran by Mr. Sediqi followed by the national anthem of Afghanistan. In the following, Mr. Noorbakhsh moderated through the conference and gave the word to the respective speakers.

## **Message from His Excellency Mr. Hamid Karzai**

Subsequently, **Prof. Walizai**, the Deputy Minister for Higher Education, read the following message of His Excellency the President of the Islamic Republic of Afghanistan to the 8th Conference "IT for Higher Education in Afghanistan":



“The current development of IT is a very important achievement in the sector of Science & Technology in the world, which has provided for much facilitation to our day-to-day lives.

IT is a new phenomenon in our country, but the new Afghan generation has showed their talent and has proven expertise in the field of IT. We all appreciate them.

Furthermore, IT training is in progress at Afghan universities and higher educational institutes, it is developing and expanding daily.

We appreciate the TU Berlin of Germany for their assistance and cooperation in the development and training of IT at Afghan universities.

The TU Berlin assisted the MoHE and the Afghan universities, and their cooperation is still in progress and in the state of expansion. Special

thanks go to the MoHE for organizing this valuable 8th IT conference in cooperation of our German friends.

I wish your conference success and God's blessing.

Hamid Karzai  
President of the Islamic Republic of Afghanistan”  
(translated from Pashto)



**H.E. Prof. Obaid**, Minister for Higher Education, welcomed H.E. the Deputy Minister from the Ministry of Communications, the representatives of the German Embassy in Kabul, the presidents and lecturers from the Afghan universities and all guests to the 8<sup>th</sup> Conference about IT in higher education.



First, he expressed his thanks to the guests which he considered a valuable enrichment for the conference. As the title suggests, it is the goal of this conference to analyze the current situation and from these results, create a perspective for the future. To

reach this goal, a close collaboration during the conference is required, as he stated. IT has a great global impact and without it, nothing could be achieved anymore. Particularly in the area of higher education this is very important, as he explained, so that the students can benefit from it, he added.

Afghanistan suffered heavily during the years of war, and it is now the time to modernize and support the country so that it can compete with other countries in the world. He remarked that this 8<sup>th</sup> IT conference is part of a series of conferences at the MoHE which had many successes in this area since 2002.

This year, as he explained, an IT board has been founded to successfully coordinate all IT projects. With the HEMIS project, he stated, the MoHE has created a network to modernize the administration and to facilitate video conferences. Each week, two video conferences are held with Afghan universities in the provinces. According to him, the MoHE estimates that Afghanistan needs 50 PhD and 500 Master graduates in the area of computer science and IT until 2024. He concluded that in the future he would like to strengthen the contacts with the international academic partners with the help of video conferences in order to benefit from their successes.

**Eng. Baryalay Hassam** Deputy Technical Minister of Communications and Information Technology (MCIT) stated that he is proud to have such an academic conference in Afghanistan.



Today, Technology plays a big and important role in our daily life, as he went on. The Ministry of Communications and Information Technology initiated a lot of developments in Afghanistan during the last years, one of them was the training of academics and experts in the field of IT. Additionally, the Ministry of Communication and Information Technology connects approximately 85% of

the people with mobile phones, manages 3G licenses for four communication operators and licensed the use of WIMAX for some companies, as he stated.

He continued to explain that his ministry has important programs for the education of Afghanistan. Like “Mobile Platform” or „Mobile Government“, MCIT has planned to create a culture of innovation in the country. Under this Program, awards will be given to students and organizations for developing applications which will benefit society. Additionally, the MCIT would be ready to help the MoHE in connecting the Universities, the way for the students to gain access to IT has to be paved, and talented students who have innovation in mind should be supported, he claimed.

MCIT has launched a skills development program in the country, under which job-oriented IT trainings on an advanced level will be provided. According to Mr. Hassam, it is planned to train 1500 IT professionals through these bridging programs.

He concluded that with these mentioned projects, the MCIT aims to expand broadband connectivity, mainstream the use of mobile applications across the government and develop the capacity of the IT sector to facilitate improved service delivery across Afghanistan, accelerating job creation and economic growth.

**Frau Sandra Wassong**, representative of the German Embassy in Kabul

Excellencies, distinguished guests, professors, teaching staff of the universities, dear students, Ladies and gentlemen:

“On behalf of Mr. Oliver Owczar, Deputy Head of Mission, who could unfortunately not be here today, it is my great pleasure to greet everyone participating in the 8<sup>th</sup>



International IT Conference and to say a few words.

First of all I would like to thank Dr. Nazir Peroz for organising this IT Conference in Kabul which is devoted to the issues of IT.

Honourable Dr. Nazir Peroz since 2002 you have been acting as IT-coordinator of the German Academic Exchange Service.

You are the Head of the Centre of International and Intercultural Communication at the Technical University

in Berlin which serves both as a platform for the exchange of information and as a centre for the annual training courses.

The result of your tireless engagement shows that you have been successfully working on a sustainable concept for the improvement of IT provision in Afghan universities as well as on curriculum development.

The first university with a modern IT Centre was Kabul University in 2003. Since then the number of IT-faculties in Afghan universities has grown to eight. An IT Department was also established at the Ministry of Higher Education in 2004.

Of course it's not just modern infrastructure and efficient technology that is needed - training is also essential.

To address this need for training, intensive summer and winter training courses at the Technical University of Berlin have developed the expertise of students, administrators and technicians.

In 2010 the first 24 lecturers returned successfully from Berlin with a Master's degree.

In 2011 a further 24 candidates took up their studies at TU Berlin and are expected to return with a Master's degree in 2013. They return to Afghanistan as multipliers.

These are examples of just some of the many achievements that have been realised at the infrastructural, technical and educational levels.

This conference represents an important opportunity for Afghanistan - the experts and the stakeholders - to meet, listen, discuss, share information and ideas and to plan for the future of higher education.

At the same time, it also serves the purpose of expanding and strengthening Afghanistan's network of IT professionals.

Germany and the German embassy support your activities in this field and I hope you will find an enriching experience, and I wish you all every success in your endeavours.

Thank you very much"

## Keynotes

On the first day of the conference, in addition to the opening speeches, three keynote presentations were given on the subject of IT.

## IT Development in Afghanistan: Changes and Challenges

Dr. Nazir Peroz, Head of the ZiiK at Technical University of Berlin

**Dr. Nazir Peroz** described in his presentation how IT could be used to establish wealth, security and stability within the Afghan society. He stressed that Since 2002, IT is on its way into the Afghan society. It has influence on science, economy, education and government and is changing administrative work flows, planning and everyday lives. In the 1970s, 80% of Afghanistan's economy has been relying on agriculture. Due to globalization, the service sector is expanding, which has also an impact on Afghanistan. He claimed that the country needs to be prepared for this, as these changes pose a massive challenge for Afghanistan. According to Dr. Peroz, the following questions need to be answered to master this challenge:

- Can the Afghan society cope with this change?
- Which resources are available and which are required?
- How to protect Afghanistan from national and international attacks on the infrastructure?
- How to make use of the energy and potential of the young generation as resources for development?
- What does the Afghan government expect from this development?
- How to design and realize IT projects?

Answers to these questions, as he explained, need to be found in the scope of discussions about strategy development in the near future. For the realization of this strategy, education in different forms is essential (IT training, training of IT professionals and academic education like Master and PhD degrees in computer science). Furthermore, he stated that a well-defined process needs to be developed which takes into account different phases for the realization of projects:

- Initialization phase: In this phase, a team consisting of qualified members needs to be built by the responsible organizations or institutions.





- Strategy phase: Here, an analysis and definition of goals needs to take place.
- Conception phase: In this phase, the requirements of the project are to be formulated and technologies selected, a detailed concept developed and comprehensive documentation written.
- Test and startup phase: Finally, the project needs to be tested and implemented.

These phases also depend on functioning, sustainable and secure network infrastructures, funding and coordination which need to be realized, as he concluded.

## Development of IT structures at the MoHE

### Mr. Salim Saay, Head of the IT department at the MoHE

**Mr. Salim Saay**, gave an overview of the development of the Ministry's IT administration. He started by pointing out the considerable progress made in the last



years. The severe lack of equipment and financing when the IT department was founded in 2004 was overcome through efficient planning and acquiring funding from different international partners.

He continued to summarize the achievements of the IT department: Between 2004 and 2008, a local telephone system and LAN was implemented, three conferences on IT were organized and IT support for the centralized concourse examination has been developed. Then in 2008, with the support of the TU Berlin and

USAID, an IT board was established and a central IT strategy for Afghanistan has been developed. According to this strategy plan, as he went on to describe, the IT department was restructured and the financing for new staff both in Kabul and at Universities was acquired. To improve the IT supply in Afghanistan the department worked in mainly three areas: network infrastructure, student information systems (SIS) and training for employees of the MoHE.

Mr. Saay remarked, that the tasks of the IT department at the MoHE can be divided into two groups: On the one hand, ongoing activities have to be managed and maintained, like capacity building at the universities, network management, online resources etc. On the other hand, the development and implementation of new projects is undertaken.

He finished with a brief introduction to the three current main projects:

- a) "Afghanistan Research and Educational Network" (AFREN), which is realized in cooperation with the MCIT. Two workshops with international experts have already taken place and the first of four implementation stages is completed.
- b) "Higher Education Management Information System" (HEMIS), the system is already completed and currently in testing and deployment phase.
- c) The "Silk Afghanistan" project was initiated for 18 universities and four new universities recently joined.

## Analysis of the IT situation at the Afghan universities

### Mr. Akmal Yaqini, Speaker of the IT Board of the MoHE

Within the scope of the 8<sup>th</sup> IT conference, the spokesman of the IT Board of the MoHE, Mr. Akmal Yaqini, presented the role of the IT Board. Furthermore, he presented the results of a survey he performed among Afghan universities about the current IT situation:

1. Presentation of the IT Board of the MoHE: The IT Board has been founded for the coordination and supervision of the IT projects of the MoHE. Also, it has the task to develop IT policies and IT strategies and to plan its realizations in order to create a secure and sustainable IT supply in Afghanistan. In his presentation, he presented the particular tasks of the IT Board in detail. For this propose, an IT Board has been established under presidency of H.E. The Minister of Higher Education, Prof. Obaidullah Obaid, and with membership of Prof. Babury, Dr. Nazir Peroz, Prof. Hassan Adelyar, Mr. Ahmad Jawed Rasooli, and Mr. Yaqini. He explained that the Board will provide good services, ideas and suggestions and is to prepare IT strategies for education centers, work on curriculum development, establish infrastructures (Internet, power supply) and more.
2. The current IT situation at the Afghan universities: Mr. Yaqini stressed that one of the first tasks of the IT Board was to find out about the IT situation at the universities with a survey and to find out how many faculties, departments, lecturers, students etc. there are at the universities and how many women are among them. Further aspects, as he went on, describe the situation at the universities regarding buildings, furniture, power supply, Internet connectivity, campus network connections etc. According to Mr. Yaqini, the results are very diverse. Also, it has been asked, if the universities have structures and human resources who are familiar with IT and what their level of expertise is.



Mr. Yaqini closed his speech by stating that further steps of the IT Board are to create a well-designed, demand-oriented planning for the realization of the IT at the Afghan universities.

## Workshop Organizations

### Mr Salim Saay, MoHE Kabul and Mr. Ralph B. Magnus, TU Berlin

The participants of the conference were kindly asked to choose one of three workshops to participate in and to work on a particular topic in a concentrated way.

The topics of the workshops have been chosen to cover different aspects of IT in

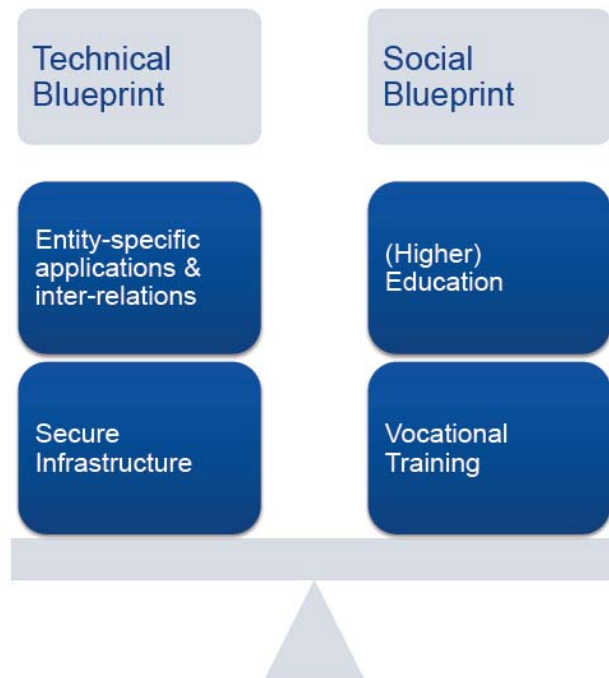


higher education and to finally provide an individual blueprint for further action. One category is dealing with social aspects and another is characterized by technical questions and concepts. A third workshop is to deal with Information Technologies in the context of vocational and higher education, which are both prerequisites for a sustainable establishment of technical infrastructures and the implementation of entity-specific applications and their (often very

complex) interrelations.

To achieve the most sustainable and self-steering impact out of all efforts, all of these aspects have to be considered in a very balanced way. If one of those aspects is treated less, there will be unpredictable unbalancing effects that will affect the whole process in general.

Each workshop has been divided into blocks of selected presentations and postponed discussions from the previous conference day. The goal has been to jointly define blueprints for the individually targeted aspects. The outcomes of each of the workshops were to be presented on the third day of the conference.



**Second day: Wednesday, December 19<sup>th</sup>, 2012**

**Workshop: *IT Education: challenges and perspective***

**Moderated by:** Mr. Abdul Rahman Sherzad, Herat University

**Opening by:** Mr. Tilman Schieber, TU Berlin

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## **Introduction**

**Mr. Tilman Schieber, TU Berlin**

After welcoming the participants, Mr. Schieber gave a general overview of the interaction between Higher Education and Information Technology. He stated that, on the one hand, IT can catalyze and enable societal change by changing the paradigms of teaching and education. On the other hand higher education needs to teach IT specialists both in the vocational and academic fields to cater to the needs of the society. He suggested, that these aspects should be seen in context and guided by a unified strategic plan to benefit from synergy effects. Mr. Schieber then introduced the contributions to the workshop by showing how they fit into the overall strategy for IT in Higher Education in Afghanistan, and shortly summarized how they will outline the challenges and show solutions in their respective field. Then Mr. Abdul Rahman Sherzad took the word to welcome the participants and introduce the first speaker.





## Educational Data Mining

### Mirwais Tanai, Sheikh Zayed University in Khost

Mr. Tanai showed an example how computer science can be used to gain insight into the challenges of higher education in Afghanistan. He presented his work on using data mining on student data. Trying to answer primarily the question why students are flunking out of university, he compared experimentally different attribute selection methods. After explaining the basics of data mining and introducing different methodologies, he showed his experimental results. These included an evaluation of the different algorithm's applicability to the problem and some correlations his analysis shows, e.g.: the students whose instruction language is different to their mother language are in the group of students who receive an average grade worse than B. Mr. Tanai offered the methods of data mining as a new mechanism of feedback in Higher Education and explained how these methods can be used to gain new insights about the challenges faced by Afghan students.



## IT Curriculum

### Mr. Hassan Adelyar, Kabul University

Prof. Hassan Adelyar from Kabul University gave a presentation on the process of curriculum development in Afghan IT education. He started with the definition of a curriculum: It consists of everything that promotes learners' intellectual, personal, social and physical development and includes approaches to teaching, learning and assessment. He argued, that a curriculum for IT in higher education should therefore be flexible and provide a strong basis for higher degrees, encourage research, and satisfy the needs of the country and market. To achieve this, a systematic approach was introduced by Mr. Adelyar which consists of five different stages:

1. Consider the available personal and infrastructural resources including those offered by national and international co-operation.
2. Specify action fields according to the country and/or market need: For computer science, those can be software engineering, network administration, web development, databases, teaching and researching.
3. Divide each action field into competences, which are the abilities to successfully meet complex demands in a particular context. For software engineering this could be for example: problem specification, analysis, design techniques, implementation and testing and maintenance.





4. Divide the competences into courses or modules. These courses should contain basic knowledge, supporting knowledge, advanced courses and elective courses. They should emphasize underlying and enduring principles, rather than details of the specific tools.
5. Distribute the courses to semesters. A good curriculum is characterized by the proper order of courses and their logically sound relationship to each other.

Mr. Adelyar concluded with an overview of the current situation of curriculum development in Afghanistan and outlined the further steps to be taken towards a unified IT curriculum.

## Distance Learning in Education

### Mr. Ashuqullah Alizai, University Herat

The contribution by Mr. Alizai set out to analyze how distance learning solutions can



overcome problems of the education system in Afghanistan, which he described to be inequalities of education level, limited access to education resources, high cost of quality education, and outdated structures. As a type of learning that takes place with the instructor and learner(s) in physically separate locations, it has the potential to generate new patterns of teaching methods and reduce geographical barriers. It also gives access to higher education to those who are not able to physically attend courses on a campus for personal or professional reasons. Mr. Alizai then gave an overview of the different forms distance education can

take and showed its respective advantages and disadvantages. He continued to point out the potential of distance education for Afghanistan as a special case, emphasizing the shortage of educational resources that prevents a lot of undergraduate student from receiving a higher education. Furthermore, there are no facilities for people with physical disabilities, excluding this group completely from higher education. Finally, for cultural and traditional reasons, many Afghan women are not allowed by their families to visit an university campus, a problem for which distance learning shows potential as well. Mr. Alizai proceeded to contrast this potential with the challenges distance education is facing in Afghanistan:

- Infrastructural problems, like power supply, high Internet cost & low bandwidth
- lack of basic IT knowledge to use distance learning facilities.

He pointed out that these challenges can be overcome by developing distance learning concepts that are tailored to the needs of Afghanistan and do not just uncritically replicate solutions from other countries. The infrastructure and experience from the universities should be used as a basis instead of creating duplicate structures with the limited resources available in Afghanistan.

## IT Education in Afghan Schools

### Mr. Sayed Ahmad Abdullah, Kabul Education University

The contribution by Mr. Sayed Ahmad focused on IT in primary and secondary education. He put it into context by emphasizing that higher education depends on a



reliable foundation of skills built in school. He is currently working on a project to analyze the situation of IT education in schools, examine the current problems and shortcomings and develop ideas to overcome them. In this presentation, he showed the preliminary results of his research, focusing especially on the information collected empirically. First, examples of teaching material used in IT classes were shown and Mr. Sayed Ahmad gave an overview of the contents taught and the syllabus currently used in schools. He reported that it had proven difficult to obtain reliable data about the actual quality and success of IT education in schools: permissions of respective authorities were hard to get

and most information could only be glanced through informal interviews and first-hand observation. However, some glaring problems presented themselves in the sixteen schools visited by Mr. Ahmad: Only one of 30 IT teachers was an IT professional and only five of them had email addresses. A computer lab was available in ten of the sixteen schools, averaging to about 15 computers each. The presentation concluded with the observation that the situation could be improved by investing into better training for the teachers while reassessing the current curriculum and working on a better cooperation with stakeholders in higher education: On the one hand, expertise and knowledge offered by the universities can improve IT education in schools. On the other hand, a good IT education in schools will prepare the ground for successful careers as computer scientist or IT professionals and provide basic IT knowledge to all students.

## Aryana Encyclopedia – The online Encyclopedia for scientific terms

Mrs. Seema Azimi, Kabul polytechnic university

The next presentation by Mrs. Seema Azimi introduced the scientific online encyclopedia named "Aryana Encyclopedia for Scientific Terms" that she started as her



Master's project in 2009. It focused on a new version that was developed in 2012, based on additional requirements and adding new features. Mrs. Azimi stated, that languages are an integral part of a country's identity and the most effective way of cultural expression among societies. The main goal of her project was to introduce ways to facilitate the development and enhancement of Afghanistan's two official languages: Dari and Pashto.

The Academy of Sciences of Afghanistan is the highest official scientific center in the country. The Encyclopedia Department at the Academy is to finalize the 6th and last volume of the General

Encyclopedia, which is considered the richest and most reliable scientific source in Afghanistan's official languages. With each volume having over 1000 articles, the encyclopedia has become expensive to publish and to purchase, big and heavy to carry, and time consuming and inefficient to look through for terms. These obstacles have led to a lack of use of it and an increased usage and introduction of foreign terms into these languages has become habitual and cultural; whether in scientific areas or in daily life conversations.

Mrs. Azimi's project tries to address this problem by developing an online encyclopedia. It allows efficient navigation through an online search interface categorized into 24 scientific fields. The article shown as a result of the search contains a full description in Dari, related illustration and a ranked list of related articles.

Furthermore the online encyclopedia system provides a forum interface, which lets the members of the Academy advertise terms and collect articles which are written and posted by specialist members in each field. Mrs. Azimi emphasized, that populating the encyclopedia requires attention and continuous contribution from members, whether professors/lecturers from universities, scientists, or researchers of any field. She concluded her presentation by talking about the current status of her project: The development is completed and the domain [aryanaencyclopediaac.gov.af](http://aryanaencyclopediaac.gov.af) has been purchased by the Academy is. It is provisioned to go online by the end of January 2013. Its goal will be ultimately to provide a reliable and easily accessible online resource for university students and lecturers to research more efficiently and productively in their native languages.

## Discussion

After the presentations, a discussion moderated by Mr. Abdul Rahman Sherzad and Mr. Tilman Schieber started. First, questions and general comments on the different contributions were heard and debated.

The topics of distance learning and IT education in schools were found to be the most controversial and interesting to the participants. For this reason, two groups were formed to collect ideas and formulate an action plan respectively. Each group discussed for forty minutes and then presented the results. Another round of discussion with all participants ensued.

Mr. Schieber then summarized the opinions and conclusions of both groups and remarked that those two topics should not be seen in isolation but have to be integrated in the existing plans and concepts in the field of Higher Education. This led to a discussion of the most prominent challenges for IT education in Afghanistan, ranging from the establishment of a CS master program to the coordination of scholarships or Afghan students. The workshop was concluded by Mr. Schieber and Mr. Sherzad, who collected the different conclusions and statements to be presented on the following day.



## Workshop: IT in Administration Processes – A Blueprint for the Future

**Moderated by:** Mr. Ahmad Jawed Rasuli, Kabul polytechnic university

**Opening by:** Mr. Ralph B. Magnus, TU Berlin

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### Introduction

#### Mr. Ralph B. Magnus

Mr. Magnus welcomed all guests and the participants of this workshop. The goal of this



workshop was to formulate an action plan that should enable all involved parties to jointly establish a sustainable IT environment for administrative support in Higher Education with a long term scope. Mr. Magnus emphasized that administration in the context of Higher Education is a very complex topic which has to deal with a huge set of very different and individual tasks. A common system to cover all these needs and requirements has to be well planned and in a modular and flexible way. Also there are many roles and different organizational units involved that have to be considered as potential target groups. According to him, a big challenge is to identify the relevant roles and to clearly encapsulate the access to the system's information. Another

big task is to keep data which can be shared between participating organizations synchronized throughout the system.

While the technically oriented questions have been covered by the individual talks and the related discussions, the overall goal of this workshop was to find a way to bundle all ongoing efforts to define and setup a unified approach for the mentioned tasks.



## National Research and Education Network – Backbone of Sustainable Management Systems

Mr. Hamid R. Mohmand, Herat University

Mr. Mohmand started by explaining that the important point is the data inside a network and that to keep data save and intact, a number of steps have to be taken. As an illustration, he pointed out that on a single computer, data could be kept save just on this computer, but if it would be extended to connect to a LAN, MAN or WAN, then a focus on security would become necessary to keep the data safe in different networks. For building an Afghanistan Research Center, as he went on, it would be important to focus more on security, confidentiality, integrity and availability of data.



He added that the Afghanistan Research Center should be connected to national and international networks. He mentioned that he wrote all necessary points about the Afghanistan Research Center in a paper to provide for more information and suggestions about this topic. Mr. Mohmand gave the examples of India (ERNET) and Africa (SANREN) to demonstrate how these projects deal with challenges and problems, what technologies they used, which way was easy and secure for them to build and implement a national and international research center.

## HEMIS – Presentation of the Current System

Ahmad Jawed Rasuli, Kabul Polytechnic University

Mr. Rasuli began his speech by pointing out that for a better administration, good management is needed and that computerization of information in the administration is an issue.

In September 2008, as he went on, he started working on the HEMIS project according to the strategy of the Ministry of Higher Education. After completion of data gathering and analysis, the development of the system began. Since about 4 years, the work on it is going on with support of the DAAD, the World Bank, USAID and UNESCO. He remarked that it is not finished yet and there are still problems with the system.



He claimed that this system will cover all aspects which are necessary for a ministry or university, like complete information of students, like current semesters, exams, grades etc., and also information about lecturers, and more.

Since 2010, a system for registration of new students has been implemented at four Afghan universities (Kabul University, Kabul Medical University, Kabul Polytechnic and Kabul Education University), but the universities do not yet support and implement all procedures that the systems offers, and there are also still issues with the system itself.

According to Mr. Rasuli, HEMIS is designed as a web-based application consisting of the following components:

Architectural style: component based and layer based

Data Access Layer (Database connector)  
Business Layer (summation or collection)  
Presentation Layer (shows or presents data to users)  
Two databases for staff and user accounts  
Backup servers, redundant server  
C# and ASP.NET4.0, MS SQL Server  
Operating System: Windows 8

Mr. Rasuli stated that an extension of the system can easily be done and that security measures are applied within different layers like https, firewalls, updated anti virus system. Furthermore, all commands to drop tables are disabled and stored procedures are implemented to avoid SQL injection. The database is not directly accessible, it can only be accessed via different layers. The system has good performance, availability and usability and is well maintainable. Authentication is role-based and encryption is implemented, as he closed his speech.

## Managing the Migration to FOSS in Administration Processes

### Mr. Waheedullah Sulimankhail, Nangarhar University

Mr. Sulimankhail began his presentation by asking why open source is necessary for Afghanistan and what the role of organizations is to improve FOSS.

He explained that Open Source (OS) are free products and that it is possible, for example, to modify the source code and to translate it to different languages. There is a license agreement for redistribution of Open Source software and there is generally no need to pay, it's free for always.

According to him, all Afghanistan organizations are illegally copying proprietary software. There is no copyright law enforcement yet in Afghanistan, but this will surely come – then Afghanistan will face problems because it is a poor country and not able to pay for softwares licenses. Furthermore, he claimed that closed source software is less secure and that when using it, anti virus solutions are required for example.



He went on to explain that some organizations even do buy licenses for the software they are using, but then they spend most of the money for buying them, which has an overall bad effect on the economy.

Mr. Waheedullah then asked how Open Source could be implemented in Afghanistan.

He stated that by using Open Source, large amounts of money can be saved while the overall reliability of systems would be improved compared to those based on closed source software.

He identified the following challenges of implementing Open Source software:

- Users tend to have problems with using Open Source software.
- Additional trainings are sometimes needed.
- A good use case for Open Source in Afghanistan is localization of applications to local languages which can simplify things for users.
- There is little contribution to Open Source projects in Afghanistan.
- A plan for localization in Afghanistan is needed.

Mr. Waheedullah listed the following ways for a migration to Open Source:

- Awareness of public and private organizations (people)
- Open Source should be taught at universities which will also push forward IT companies within the local marketplace
- Cooperation of private companies with education centers

He finished his speech by stating that the ZiiK of the TU Berlin is fostering the use of Open Source software in all its projects since 2002. Since 2008, there is an Open Source work group in Afghanistan which has been initiated by computer science Master graduates from TU Berlin.

## Concept for Implementing University Portal Systems

### Mr. Mohammad Rafi Bahez, Kabul University

First, Mr. Bahez explained that a portal is a system which can be accessed via the Internet after authentication for providing access to particular information according to user's requests.

According to Mr. Bahez, the following portals are implemented at the MOHE so far:

- AFGHAN campus medical, by the University of Washington DC,
- Afghanistan eCampus, by Germany,
- Angel, USA, which covers all Afghan Universities.

He added that there is another portal for Kabul University but which is not in use yet.



According to him, a major problem for the operation of the portal servers in Afghanistan is the poor Internet bandwidth. Downloads take very long and access is slow.

He went on asking what the need is for four parallel portal systems and made the following suggestions:

- The physical location of the portal server should be in Afghanistan, otherwise bandwidth would be wasted and traffic problems would arise.
- Servers on different locations inside and outside Afghanistan could be mirrored, which would allow for fast access and reliability.
- A “single sign on” would be required, otherwise users could become confused. This will make multiple services appear as one consistent portal system.

He concluded with the following recommendations:

- For each portal, responsibilities are to be clearly defined.
- A stable and reliable infrastructure needs to be established to allow for a high availability of the systems.
- Setting up a portal is easy, but maintaining it is difficult. A special focus has to lie on this aspect.
- Redundant mirror servers should be established to provide for stability and availability.

## Management Systems in Higher Education

### Amad Siar Mehri, Kandahar University

Mr. Mehri began his speech by explaining that information systems are used



everywhere in everyone's daily work - even doing paperwork can also be considered an information system. According to him, information systems can extend and improve our work flows and provide for good effectiveness. He then asked the question what "data" actually is.

Data, as he went on to explain, is a general fact – but not yet "information". He gave the example of a color, which would be "data", when it is used for e.g. a birthday, it becomes "information".

Correspondingly, information systems are ways or devices which prepare procedures or process data to become information.

He then described two aspects of the HEMIS project, which is a transaction processing system to store and process data. This will happen in two ways: batch processing which will produce collections of data and real time processing to allow for all Afghan systems to enter data and instantly receive information which can be accessed directly via the MoHE.

He went on characterizing the process flow within the system as follows:

Information System → gathering requirements → analyzing the information

He made the following suggestions for HEMIS:

- Realization of measures against power failures
- Implementation of fault tolerance systems
- The redundant servers of the system should be in different physical locations
- Open Source is to be preferred over closed source software
- Developing an economic case
- Setting up a transaction system for the provinces which should be connected with the central system

Mr. Mehri concluded that HEMIS should be built as a modular architecture, and users should be able to access specific parts. Data transfers should be restricted to certain day times as there are connectivity problems in the provinces. This will also avoid security issues.



## Single-Sign-On Mechanism for Management Services

### Ali Aqa Naseri, Kabul Polytechnic University

Mr. Naseri began his presentation with the statement that the AFREN and SILK projects which have been described earlier will help people to reach their goals, but services need to be designed for better usage.

“Single Sign-On”, as he explained, is a service which provides centralized access to the system for all users:

- Different services can be reached via a single user name or email address. This will help to avoid having different emails (accounts) for different services,
- This technology allows for roaming networks at all participating universities



He went on describing the concept for the implementation of this service:

When all universities will be connected, it will be possible to implement this service in the context of AFREN. Fallback servers outside of the country would allow for access to the network from other locations, even abroad, with the same user name, even if the local servers are not available. As a corresponding example, he mentioned the “eduroam” service for world-wide WLAN access which is also available TU Berlin.

Mr. Naseri finished his speech by stating that before implementing such a service, stable infrastructures need to be available, and all universities should be connected. As a start, this could be implemented at each university with a local scope and later on, after connection of all universities, the service could be extended.

## A web-based framework for a unifies modular campus management

Wazir Khan Ahmadzai, Kabul Educational University

Mr. Khan began his speech by presenting his ideas regarding the establishment of a modularized and unified campus management system. His major point was to emphasize the big chance for Afghanistan of being able to start from scratch with designing such a system on a national level. In order to be able to cover the individual needs of a particular university, the system would need to be built as a very modular architecture. This way, each instance can be set up with the modules enabled that are necessary to meet the individual local needs.



He divided these modules into local and globally centralized modules. The local ones only would have a limited local scope (local campus) where the global ones have access to shared information and are able to operate on an inter-university scope. For those centralized modules, an adequate location/environment has to be defined for the required service topology, as Mr. Khan closed his presentation.

### Discussion

After the presentation, it has been discussed about HEMIS as a large system for higher education in Afghanistan. Core points were IT security and sustainability. Here, particularly the ideas of Mr. Wazir Khan Ahmadzai and Mr. Rafi Bahez to create a unified system were of interest. For this project, Open Source software is to be used, because later on, Afghanistan will not be able to cover the license costs. Also, the participants developed further ideas for the discussion on the third day.



## Workshop: Securing IT Infrastructure

**Moderated by:** Ahmad Zia Sharifi, Nangarhar University

**Opening by:** Chi-Thanh Christopher Nguyen, TU Berlin

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### Introduction

#### Chi-Thanh Christopher Nguyen

Mr. Nguyen welcomed the participants and introduced them to one of the important topics of this workshop: the Afghanistan Research and Educational Network (AFREN). He then gave a short overview of the German National Research and Education Network (DFN): The DFN is a communications network for science and research in Germany. It operates the network that connects universities with each other and to the Internet and has established various competence centers to provide advice and support to universities. According to Mr. Nguyen, German universities traditionally have a high degree of autonomy. When it comes to internal IT structures, the universities know best (or at least they think they know best).



Therefore, a large number of different campus management systems exist. Despite the diversity of these systems, as he went on to explain, the DFN manages to operate the “eduroam” service. Eduroam allows members of one university to use wireless Internet access in other universities, now part of a world-wide network. Single sign-on is a prerequisite for this service.

Mr. Nguyen mentioned that, as university's IT systems store, process and transmit important and valuable data, they must be protected against attacks. The DFN Computer Emergency Response Team (DFN-CERT) provides information and support in IT security related areas, alerts about software vulnerabilities, network scans, security incidents and training and workshops on IT security.

### Results of the Dubai AFREN Workshop

#### Mr. Maihan Yaqubi, Kabul University

Mr. Yaqubi began his speech by stating that on 13-14 December 2012, the 2<sup>nd</sup> Workshop on AFREN was held in Dubai, United Arab Emirates. He stated that since the previous workshop on AFREN, 85% of the planned actions have been accomplished. The List of equipment required for AFREN has been prepared and submitted to the Ministry of Communication and IT. APNIC has registered a block of 32,000 public IP addresses for AFREN, as he mentioned, and the test for the advertisement of it to the Internet has been successful. The design of monitoring, security and network management systems has been completed and is now under implementation, he



stated.

Mr. Yaqubi remarked that at the workshop, a new list of action items has been created. These include proposing the plans to the Ministry of Finance for funding, informing AFTEL about the required bandwidth for the AFREN PoPs and submitting a plan for having connections installed and tested by AFTEL in KU, KEU, KPU and MOHE by the end of February 2013. The project for the monitoring, management and security for AFREN has to be accomplished and active within five months by June 2013. He said that the physical location of the AFREN NOC will be at Kabul University. Security measures at PoPs should be implemented for important data and traffic at the moment, and a concrete plan has to be made for future requirements. By the end of February 2013, security measures between Kabul and Jalalabad have to be implemented. An exact estimation has to be made for the funds to be provided for AFREN.

Mr. Yaqubi concluded his speech by stating that the next AFREN workshop will be on 6-7 March 2013.

## AFREN Infrastructure

### Mr. Tariq Meeran, Lecturer at Kabul University

At first, Mr. Meeran explained that AFREN is a national research and educational network (NREN) for Afghanistan's academic community which was initially and



unofficially formed in 2006. He added that AFREN focuses on supporting and providing high speed network backbone to universities, higher education institutions, teaching hospitals, libraries and research centers at national level. This will allow academia to have access to the Internet, online resources, digital libraries, international research communities, e-communication, distance learning, e-learning, tele/video conferencing and knowledge sharing. AFREN will also represent all higher education institutions to donor agencies, ISPs and other organizations. According to Mr. Meeran, AFREN will also include a Computer Emergency Response Team (AFREN-CERT) to

allow for coordinated responses to security threats. As a result, all these services provisioning and support lead to a sustainable infrastructure for facilitating quality research and development efforts. He claimed that in order to achieve this goal, a very strong network infrastructure with a long-term technical and financial support is required. AFREN's goal is to plan, implement, operate, maintain and support such an infrastructure. From the perspective of an NREN, most of the major educational institutions are currently connected via Fiber Optic or Satellite links to the Internet in an unorganized manner, while the NRENs should be built in such a way that the educational institutions are connected with national high speed dedicated point to point links to each other and then from one central point to the Internet or international links, as he concluded.



## A concept for sustainable implementation of AFREN project in Afghanistan

### Mr. Mussadiq Jalalzai, Lecturer at Kabul University

Mr. Jalalzai began his presentation with some statements about AFREN: The Afghanistan National research and Educational Network project (AFREN) is currently under development and funded by the NATO. He mentioned that, as most of the projects in Afghanistan are funded by foreign countries and organizations, the sustainability of this project is one of the most important factors to be considered. If a



project has high implementation and maintaining costs, it will not be easy for the Afghan Ministry of Higher education to provide budget for it.

In order to address this issue, he would suggest a concept for a sustainable AFREN implementation. The main idea behind this concept would be the usage of Open Source technology instead of commercial software where applicable, since open source technology is cost effective and flexible. He went on suggesting the implementation of thin client technology that helps in lowering the costs and would be a further step towards green technology. He finished his speech by explaining that he

performed a comparison of the costs for commercial closed source and open source solutions and showed an estimation of the USD amounts that can be saved if Open Source technology would be implemented for the mentioned services.

## A Glance to Sustainable Power Solutions

### Mr. Abdul Rahman Vakili, Head of IT at Herat University

Mr. Vakili started his speech by stating that Afghan universities are currently depending on unreliable municipal power grids for operating their IT infrastructure. He claimed that equipment for backup power needs to be sized and planned to handle worst case scenarios, requiring considerable investment in electricity generators, fuel and associated power infrastructure. He went on proposing a method to limit the sustained power usage in case of power grid failure, lowering the requirements for equipment and reducing purchase and maintenance cost. This method includes virtualization technologies and migration of services between physical servers. As a conclusion, he showed that this method can be adapted further to situations of fluctuating power input such as from solar panels.





## Wireless Mesh Networks Infrastructure Approaches

### Mr. Niaz Mohammad Ramaki, Kabul University



Mr. Ramaki began his presentation with the statement that each day today, (mobile) communication devices are getting smaller in size, higher in performance, and are in wider use by people who want to connect themselves with good mobile support and highly available networks. He explained that a wireless mesh network is a self-configured, self-healed, and self-organized network of mobile and fixed devices. In such a network, there are number of nodes (mesh routers and mesh clients), and links (usually wireless) of back-haul and access links. Wireless mesh networks can be built using established wireless technologies (i.e. IEEE 802.11, IEEE, 802.16, IEEE 802.15) for different purposes. Mr. Ramaki gave the example of an ISPs who could use mesh networks for the MAN (Metropolitan Area Network) where it wants to provide Internet services and avoid the need to install DSL cabling. Likewise, wireless mesh networks would be applicable in different situations such as at temporary events (e.g. video conferences), in historical buildings where no cabling is permitted, or where wiring is impossible (e.g. airports). He stressed that wireless mesh networks sometimes function as complements for wired networks, for example if the plan is to extend a wired network but due to lack of budget, a wireless mesh network would be a better solution.

According to Mr. Ramaki, there are several approaches in configuring a wireless mesh network depending on the numbers and types of the mesh nodes, application areas etc., the most promising of which he will discuss in his thesis paper along with possible applications in higher education in Afghanistan.

## Securing the Transition to IPv6

### Mr. Ghulam Sanaie Ghaznawi, Kabul University

Mr. Ghaznawi began his speech by stating that when the specification of the Internet Protocol (IP) was first published in 1981, the Internet consisted of only a few nodes that were mutually trusted. Therefore, many security issues were not considered in IPv4, besides the fact that the IPv4 address space was considered vast enough. As the Internet has been growing rapidly since its commercialization, the number of Internet users have exploded and the IPv4 address range started to deplete. Some of the regional Internet registries (RIRs) address pools have already been exhausted and after 2013, none of them will distribute IPv4 addresses anymore.



He drew the conclusion that the only solution is to migrate the current IPv4 based networks to IPv6, for which a big International campaign has been started on 6th of June 2011 with the so called "World IPv6 day" and one year later with the "World IPv6

launch day". According to Mr. Ghaznawi, campaigns of this kind also need government support. For this reason, the Afghan Ministry of Communication and Information Technology has instructed all ISPs in the country to start the IPv6 migration process at the end of December 2012, but they failed due to different reasons and the migration date has been postponed to the end of January 2013. He mentioned that the Afghan Research and Education Network (AFREN) as an ISP for academic institutions also needs to start this migration process as soon as possible, but questions remain on how to start, which transition mechanism to use, and what security aspects should be considered to successfully deploy IPv6 in the future. In his thesis paper, Mr. Ghaznawi will discuss these questions and make a proposal for actions going forward in the IPv6 transition, as he concluded.

## Information Security in Higher Education in Afghanistan

### Mr. Khwaja Zubair Sediqi, Politechnic University Kabul

Mr. Sediqi began his presentation by explaining that the Ministry of Higher Education (MoHE) has planned and is working to build up stable IT Infrastructures and cultivate IT education at all universities of Afghanistan. The Higher Education Management Information System (HEMIS) is an example of IT systems that stores information in digital format. He stressed that information is an asset which, like other important business assets, has value to an organization and consequently needs to be suitably protected.



Considering the phrase 'technology is part of information security', as he mentioned, it becomes more important to understand the importance of information security at the MoHE. Mr. Sediqi said that the purpose of his presentation is to provide awareness about IT security and to explain the importance of information security for the MoHE and maybe any other organization. In his Master thesis, he wants to explore security threats, system vulnerabilities, attacks, introduce information security principles, detection and prevention of security flaws, information security policy and other concerns regarding IT security. According to him, the aim of his work is to provide a clear view regarding IT security to participants and help MoHE to consider these IT security factors in IT infrastructure plan, design and implementation.

He added that security is not only IT security and it includes the people, process and technology to be secured. Referring to his thesis, he stated that current threats and vulnerabilities will be explained and examples of security breaches and their solutions will be introduced.

## Discussion

The workshop was moderated by Mr. Ahmad Zia Sharifi, Dean of the Faculty of Computer Science at Nangarhar University. The discussed topics included the Afghanistan Research and Educational Network (AFREN), building up Infrastructure using Open Source technologies, wireless mesh networks, IPv6 and security at Afghan universities and sustainable power concepts. At the end of the workshop, the participants discussed about these topics. Eventually, Mr. Vakili was chosen to present the results of the workshop on the third conference day.



## Third Day: Thursday, December 20<sup>th</sup>, 2012

**Moderation:** Prof. Baray Sediqi, Deputy Minister of the MoHE, Dr. Nazir Peroz, Head of ZiiK at TU Berlin and Mr. Salim Saay, Head of the IT Department of the MoHE

### Presentation of Workshop Results

The last day of the conference had the goal to discuss the results of the three workshops.



The results of the Workshop **"IT Education challenges and perspective"** were presented by Mr. Sherzad, University of Herat. The results of the Workshop **"IT and administrative processes"** were presented by Mr. Rasuli, Politechnic University of Kabul and the results of the Workshop **"Securing IT Infrastructure"** were presented by Mr. Vakili,

University of Herat.

### Results of the Workshop: IT Education challenges and perspective

#### Mr. Abdul Rahman Sherzad, Herat University

Mr. Abdul Rahman Sherzad began to give a short summary of the presentations from



the previous day. After this, he explained that the workshop contributions showed the current situation and demand and suggested ideas to improve the situation and meet the demands. In the following,

he presented the two focus topics of distance education and education in schools.

### **Distance Education**

Mr. Sherzad pointed out that the eventual use of distance learning methods in Afghanistan should be carefully fitted to the demands and current situation of the country. To achieve this, the social, technical and administrative framework of such methods have to be considered: Developing the social framework needs to take into account the specific demands of the Afghan society. The consensus of the workshop participants was that distance learning solutions should amend traditional face-to-face learning and not replace it. It could be used to reach groups that are currently excluded from higher education, e.g. people with physical disabilities, people in remote rural areas, students that need to work to support themselves and women who cannot attend lectures for traditional reasons. The acceptance of such solutions by both the teachers and the prospective students should be evaluated beforehand. The technical framework has to be fitted to the available resources and existing infrastructure. As the personal and technical infrastructure in higher education is already stretched thin, new initiatives in distance education must not be detrimental to face-to-face teaching. The feasibility of any technical solution should be evaluated in the face of the unreliable power supply and lack of basic IT knowledge especially in rural areas. Finally, to implement effective distance education solutions, it has to be made sure that an actual degree can be achieved by this means. This depends on quality control and a regulatory framework that sets clear criteria.

### **IT Education in Schools**

Mr. Sherzad continued with the topic of IT education in schools, pointing out that the main goals in this regard are to improve IT literacy within the Afghan society at large and to improve the skills of students entering the universities. He pointed out that the current situation suffers from a lack of feedback mechanisms and quality control. Furthermore, there is no coordination and cooperation between the demands of higher education and IT education in schools and a severe lack of teachers that are qualified to teach IT. The conclusion of the discussion in the workshop was that capacity building in the form of teacher training must be central to any improvement in this area and that this must be part of a coordinated effort between the different stakeholders in Afghanistan's education system. It was also suggested that an advisory panel mediates between representatives of the relevant ministries and other stakeholders to jointly determine the measures taken to improve IT education in schools.

### **Conclusions**

The focus topics are only two aspects of the complex challenges the Afghan higher education system is facing. Mr. Sherzad continued to outline how they could fit into a unified strategy, emphasizing that new measures should only be implemented as part of the existing strategy. The focal points of this strategy are to

1. continue to evaluate the needs of Afghan society in general and the labor market in particular and adapt a unified curriculum to educate students that meet these needs.
2. improve the quality and quantity of university teachers by coordinating international scholarships for master and PhD programs for university lecturers.
3. develop a long-term plan for post-graduate education in Afghanistan, eventually implementing a Master's program in Afghanistan.
4. Prevent insular solutions by improving coordination and feedback across higher education, integrating different initiatives into a common strategy plan.



## Results of the Workshop: IT and administrative processes

### Mr. Ahmad Jawed Rasuli, Kabul Polytechnic University

Mr. Rasuli presented the results of the workshop and introduced the participants to the



overall goals of the workshop, where about 45 persons participated. In the beginning, a few presentations took place, and in the following, the question has been discussed of how to gather and coordinate all efforts to jointly build and establish a complete and unified management system

for administrative processes in the general higher education context on a long term.

Answers to this questions were given which lead to the formulation of an eight point action plan for the next few years:

Action Plan - Blueprint:

Do the activities so far cover the needs?

- Create work group for security aspects
- Create work group for usability aspects
- Missing sub-modules (provide proposals to the IT board of the MoHE)

Which needs can be met by IT based services and which not?

- Develop policies and legal regulations

Which infrastructural prerequisites have to be fulfilled in advance?

- Make the most out of the resources which are available now
- Infrastructure will be enhanced step-by-step

How to integrate new ideas into already existing solutions?

- Perform analyses of the present systems, provide clear proposals, implement them conjointly

How to avoid redundancy / clearly define service responsibilities / guarantee demand oriented services?

- The IT board of the MoHE has to confirm every new proposal / service
- The IT board of the MoHE chooses the "best" solution targeting the unification
- No foreign dictation

How to provide a comfortable and secure way of authentication?

- Outsource research to a master thesis on distributed authentication mechanisms

Which information has to / can be shared with whom and how?

- Systems have to adopt all conventional rules and regulations to create a broad acceptance. Analysis of situation is required first.
- Certain manual steps have to be considered to be kept manual.

The participants agreed that if this plan will be taken as a blueprint for the next year, the given question can turn into the statement: "We gather and coordinate all efforts to jointly reach all these goals, to build and to establish a complete and unified management system on a long term!" For Afghanistan, the current situation can be understood as a big chance as we are able to start from scratch with a unified system on a national level. This chance has to be taken, all efforts have to be gathered and coordinated well to define, conceive and implement such a unified system.

## Results of the Workshop: Securing IT Infrastructure

### Mr. Abdul Rahman Vakili, Herat University

Mr. Vakili introduced the results from the IT infrastructure workshop where about 45 participants took part. Within this discussion, participants presented their results which have been discussed controversially afterwards and proposed solutions.

A number of problems were identified regarding the AFREN Board, which oversees



the AFREN development and planning. These include a communication problem, specifically the lack of documentation and non-existing reports. The membership structure of the board is unclear, as some persons who were listed as members were unaware of the fact that they are

actually members.

As a solution and proposed action, the AFREN board members should be reconsidered and inactive members removed. The AFREN board will provide documentation and reports. It is the responsibility of the IT board of the MoHE to supervise this.

### Power supply

For the problem of unreliable grid power, there is currently no sustainable solution implemented.

The proposed action is to do further research to find sustainable solutions and resources for a sustainable and stable power supply.

#### AFREN Software

The planning of the AFREN infrastructure currently includes a number of systems which will run on proprietary platforms. In the interest of cost saving and sustainability, Open Source solutions should be preferred where they are suitable. However, it is unclear yet whether Open Source routing solutions can replace costly proprietary Cisco routers.

A policy should be issued to use Open Source as much as possible. Research should be done on the issue of suitability for routing, by performing extensive testing of Open Source products

#### Wireless Mesh Networks

In the current phase of the AFREN project, it is not planned to connect schools to the network, although a provision exists that makes this an option at a later date. It is however clear that connecting schools the same way as connecting universities will be expensive. If wireless mesh networks could be used in the future to connect schools to the AFREN, this could lead to significant cost savings. But it is unclear yet whether this approach is feasible at all.

Research must be done and test networks of wireless mesh networks be deployed to determine whether they are suitable for connecting schools to an AFREN uplink.

Currently, the AFREN NOC has only one Internet uplink, which is a single point of failure. Therefore, a second uplink needs to be installed.

#### AFREN NOC

The AFREN NOC itself is also a single point of failure. In case the NOC ceases to operate due to fire or other disaster, there is no backup operation center which can take over. This would lead to the disruption of AFREN services.

For the NOC, there is no immediate solution. A backup NOC cannot be implemented in the current phase, because the agreements with the donors include only a single NOC for now. It needs to be proved first that the single NOC works, and then a concept is needed for a distributed NOC.

## Final Discussion about the resulting measures and their implementation

The discussion was moderated by Prof. Baray Sediqi, Deputy Minister, MoHE, Dr. Nazir Peroz, Head of ZiiK at TU Berlin, Mr. Salim Saay, Head of IT Department of MoHE, Prof. Hassan Adelyar, Kabul University, Mr. Ahmad Jawed Rasuli, Kabul, Polytechnic University, Mr. Abdul Rahman Sherzad, Herat University and Mr. Akmal Yaqini, IT Board of the MoHE. After the presentations of the workshops, all participants of the conference had the opportunity to ask questions the workshop topics. For each workshop, a time frame of 20min was planned for questions and answers.



At first, the results of the **IT education challenges and perspective workshop** have been discussed. The participants thanked for the presentation of the results and asked their questions. The first question was how to establish a common education concept which integrates school and academic education and which role the universities have in this concept. The participants agreed with this argument, but stated that it is important to educate qualified teachers in the area of IT. The universities expressed the wish to create computer science faculties to cover these needs. It was discussed among the participants, if Afghanistan should have a unified IT curriculum. It has been argued that in this case, the universities would be bound to a certain set of study courses and subjects. This has been denied, as first of all, basic knowledge and expertise needed to be taught in this area.

An important topic of the discussion was distance learning. Many participants asked for an explanation what distance learning actually is. The IT Board of the MoHE is to deal with this question and inform the universities respectively. It is clear, that face-to-face education should never be replaced in Afghanistan. Especially Afghanistan with its history of more than 20 years of war needs this kind of traditional education. Even most western industrialized countries, even though they could implement distance learning, focus more on face-to-face education.

After this, the results of the **IT and administrative processes workshop** have been discussed. Main aspect was that the universities need to improve its administrative structures, to which all participants agreed. It is the question now, which technology and platform to choose, how to integrate them and how to

sensibilize the employees to the use and the needs of such technologies. For a sustainable and secure implementation it has been suggested to involve the current computer science Master students in this process and to focus on Open Source solutions. The IT Board of the MoHE is to draft a plan how to structure this process.

There have been many discussions about the results of the **Securing IT Infrastructure workshop**. First of all, the participants criticized the name “AFREN” as it matches the name of a similar project for Africa. It was suggested to use a small “f” in the project name. Many participants suggested to define goals and activities of AFREN for the universities. One of the participants proposed to develop a life cycle of the project with the following steps:

- Analysis of problems
- Structure Requirements Specification
- Management
- Planning
- Maintaining

This life cycle has to be supervised by a work group. He suggested that the IT Board is to establish such a work group to not create problems and increase transparency in this matter.

Some participants argued that the name of IT should generally be more explained within society.

All in all, Open Source solutions have been favored by the audience. These technologies should be selected soon now for a most sustainable and future-proof structure. Many participants suggested, though, that it should not be acted too quickly but to base the decisions on analysis of the current IT situation and the respective requirements.

In the end, Dr. Peroz thanked the MoHE and the participants for the support and the Federal Foreign Office and the DAAD for the funding and the support of the conference. He also expressed his thanks to the employees of the TU Berlin for the organization of the conference and the workshops. Prof. Sediqi also thanked the participants and the TU Berlin for the good cooperation. Finally, he issued certificates to some of the participants of the conference on behalf of the MoHE.