

COMMUNITY BASED TRANSLATION OF ELEARNING MATERIALS

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SUMMARY

Cisco Networking Academy proves to be a viable project in the area of education of networking professionals. All educational materials are presented in English and students are required to study in English too. Our experience shown that it is worth for the students to have a localized curriculum as well. Official translations are extremely expensive. On the other hand, many Local Academies provide some form of translation of curricula to their students. We decided to develop an environment based on Web 2.0 technologies, to provide community tools for collaborative translation of curricula and its distribution to Academy students. The paper describes basic ideas of the developed solution and presents some results in the translation of the CCNA curricula.

Keywords: wiki, elearning, collaborative translation

1 INTRODUCTION

Cisco Networking Academy [1] proves to be a viable project in the area of education of networking professionals. All educational materials are presented in English and students are required to study in English too (because the module exams are provided only in English). Our experience shown that students are more productive having a curriculum translation in their native language. In this case, they are not required to search translation dictionaries for unknown foreign words or phrases and they can concentrate on study itself. However, an official translation, provided by the Cisco Learning Institute, is extremely expensive because of high quality requirements. On the other hand, many Local Academies provide unofficial curricula translations (or parts of curricula) to their students. These translations were made by students or instructors. Quality of these translations varies from case to case.

To solve the problem of scattered curricula translations, we decided to develop an environment based on Web 2.0 technologies and tools. The presented solution provides to the Cisco Networking Academy (NetAcad) community tools for collaborative translation of curricula and its distribution to the Academy students. It should help the community to collect translations done locally into the single central storage. The paper describes the basic ideas of the developed solution and presents some results about the translation of the CCNA curricula.

2 WIKIS

Wiki is kind of a social software that enables people to easily collaborate on content creating and changing. This process is typically done just through a web browser interface. Wiki, as a technology, is often used inside organizations or by communities of practice/interest. The power of wiki based applications is in the Metcalfe's law:

“The more people who use something, the more valuable it becomes” [3].

A wiki is commonly known as a collaborative website which can be directly edited by anyone with access to it. Such a website is i.e. www.Wikipedia.org, the most known wiki website on the World.

As stated in [2]: “A wiki enables documents to be written collaboratively, in a simple (markup) language using a web browser. A single page in a wiki is referred to as a “wiki page”, while the entire body of pages, which are usually highly interconnected via hyperlinks, is “the Wiki”. A wiki is essentially a database for creating, browsing and searching information”.

A defining characteristic of the wiki technology is the ease with which pages can be created or updated. Generally, there is no review before modifications are accepted. Many wikis are open to the general public without the need to register any user account. This can lead to abuse of the system. Private wiki systems require user authentication to edit, sometimes even to read pages [2].

2.1 Wiki - collaborative way to create learning materials

While creating the content of learning materials, we usually write those materials in our favorite text editors (MS Word, TeX, ...). Then these documents are sent for a review to other people in the editors' team. Some people write down some comments to our documents, some people change some text, but at the end, when they send us back their feedback and changes, we have to merge all those comments and changes together. While working in a small team this can be a pretty easy work, but as our editors' team is getting bigger, then this kind of collaboration on a content creating can be definitely difficult. A wiki is just in place for this kind of applications - collaborative creating of content. Creating content in a wiki based application at the beginning

simply means just creating the first version of content. Then additional changes to the content are tracked by a versioning system. This approach enables anyone to write down their comments to the content, change some parts or the whole content to fit their ideas or needs. Changes done by a single user are automatically published, so other users can continue in the editing process on the newest version of content, or if they like, they can edit any of a previous versions. Changes between different versions of the content are shown in a user-friendly way by creating a diff(erential) view.

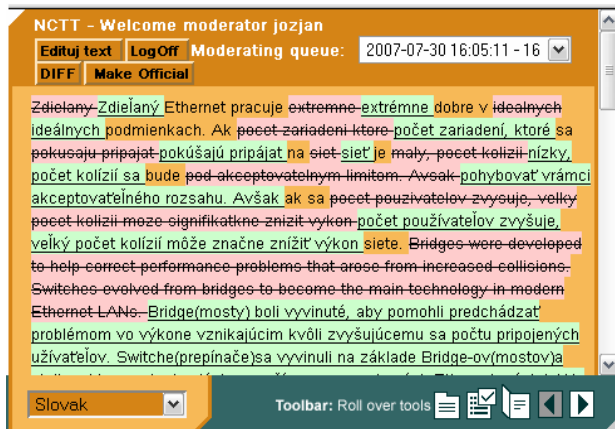


Fig. 1. Diff view in NCTT

In more sophisticated wiki like systems, multiple people can view and make changes at the same time. There may be an on-screen chat window for the just edited document, revisions showing exactly what has been changed and who has made the change, and of course when [4].

All these features enables a very easy and yet more effective collaboration, while having a powerful tool in the background.

2.2 Quality issues

Quality of a wiki like systems content may be sometimes a heavily discussed subject. Many discussions may be on the formatting of the content, i.e. using bold fonts or italic, or using a flow layout or a delimited? These issues can be addressed and solved by creating simple guidelines to define how the content has to look like.

Other discussions on the quality may be on the content itself. This is more problematic; because some editor may think that his or her version is better than the version of others. This case can be solved automatically by having users to vote between two different versions, or by having a moderator or a reviewer to decide which version is better.

The evolution of the content in wiki systems, also with a helpful input from discussions, is almost always converging to the best. This process can be viewed and

monitored by checking a history and/or a diff view with highlighting the changes between two versions.

2.3 Security issues

Wikis are generally designed with the regard of making it easy to correct mistakes, rather than making it difficult to make them. Thus, while wikis are typically open to public, they provide a means to revert changes very easily.

Because of the open philosophy vandalism can be a problem in wiki sites. Vandalisms can remain unnoticed for a period of time. As said in [5]: "Wikis by their very nature are susceptible to intentional disruption, known as "trolling". Wikis tend to take a soft security [5] approach to the problem of vandalism; making damage easy to undo rather than attempting to prevent damage. Larger wikis often employ sophisticated methods, such as bots that automatically identify and revert vandalism and JavaScript enhancements that show how many characters have been added in each edit. In this way vandalism can be limited to just "minor vandalism" or "sneaky vandalism", where the characters added/eliminated are so few that bots don't identify them and users don't pay much attention to them". In larger wiki systems, such as Wikipedia, where in the background is a huge community of people and editors, this community is working as a system to control the vandalism issues.

The amount of vandalism a wiki receives depends on how open it is. For instance, some wikis allow unregistered users, identified by their IP addresses, to edit content, whilst others limit this function to just registered users. There is one drawback of this kind of authentication: a big group of users can be hidden by a single IP address which is commonly used in MAN networks. We agree with the statement in [5], that "closed up" wikis are more secure and reliable but grow slowly, whilst more open wikis grow at a steady rate but result in being an easy target for vandalism.

To provide the fast growing system, while having the official content on a high quality level, it is worth to consider other approach: allow doing changes in a content to everyone, but deny automatic publishing and replacing of the official content with the just uploaded and edited content. All changes will be available for everyone to view in a special moderator queue. In this case the moderator role has to be implemented. Moderator has the privilege to say that the changed content is really better than the actual official content and can be replaced. This approach can be combined with other solutions which were described above. The benefit of the mentioned solution is the high quality level of the content. On the other hand the disadvantages are in a single point of failure – a human moderator. This solution also brings a huge amount of responsibility on moderators.

3 NETACAD CURRICULA TRANSLATION TOOL (NCTT)

Company Cisco Inc. provides web based learning materials within its global learning initiative – Cisco Networking Academy. The Cisco Networking Academy is a comprehensive e-learning program that provides students with the Internet technology skills essential in a global economy. The Networking Academy delivers web-based content, online assessment, student performance tracking, hands-on labs, instructor training and support, and preparation for industry standard certifications. Launched in October 1997 with 64 educational institutions in seven states, the Networking Academy has spread to more than 150 countries. Since its inception, over 1.6 Million students have enrolled at more than 10,000 Academies located in high schools, technical schools, colleges, universities, and community-based organizations.

Generally the learning materials (curricula) are available in English language. Some courses are also available in other world languages. Unfortunately some students, who do not speak English as their mother tongue, have difficulties to study in English. The ideal situation would be to have the curricula translated into all languages. The translation process of curricula is very difficult to do on the official regular basis. First it requires a company which can provide a technical English translation, and then it requires constant upgrading when the original text changes. This usually costs a huge amount of money.

NCTT (NetAcad Curricula Translation Tool) has been developed by a team of students and teachers to address this issue. NCTT is a set of applications and tools which allow easy and user-friendly translation process of a text part of the Cisco NetAcad official curricula. NCTT provides an easy way to view, create, edit and manage the translation of a curriculum text. The translation process is based on a wiki like technology and generally every member of the NetAcad community can be a translator. The tool and the translations are provided as supporting materials for NetAcad students, not as a replacement of the original English curricula. Therefore the implementation of NCTT is tightly integrated to the original GUI of English curricula, and at the same time provides text in both languages - the original English and the translated version (fig. 3).

3.1 NCTT Practical implementation

While having a nice idea of the NCTT tool, it was not easy to integrate it into the current GUI of curricula as much as it is possible. First ideas were to create just a web page where the translations will be stored, so if a student wanted to see a translated version, he or she would open a new browser window and locate the required translated text. This idea is not very user-friendly, therefore other ideas were developed.

The curricula in their current version are HTML/CSS/JS based web pages (fig. 2). Adding our own HTML/CSS/JS code into these pages would allow adding our own GUI parts to the original GUI. Because we don't have access to servers where the curricula are stored, we generally cannot change the source code of curricula to implement our own GUI parts. Fortunately modern web browsers support plugins which can do almost anything with the displayed web page. Developing a browser plugin enables injecting our own code into the original HTML/CSS/JS code of the curricula. The NCTT web browser plugin was developed for Microsoft Internet Explorer and Mozilla Firefox web browsers. The Mozilla Firefox version is platform independent and can be used by Microsoft Windows, Linux or other operating system users.

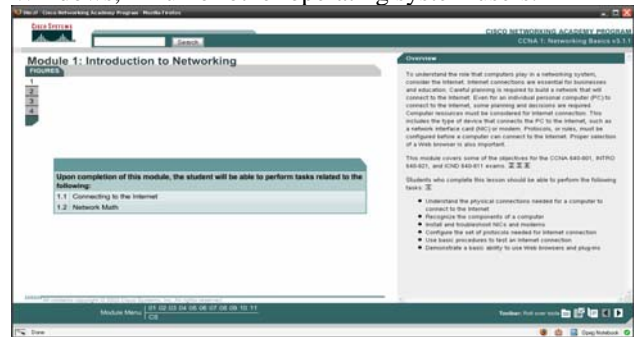


Fig. 2 – NetAcad curriculum

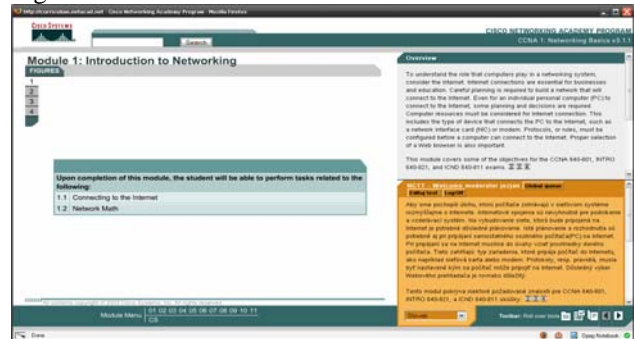


Fig. 3. NetAcad curriculum with NCTT

The plugin detects if a displayed page is a NetAcad curriculum, and if it is, it injects the NCTT code to the end of this page. Once the NCTT code is loaded, new GUI parts are added to the original GUI. First only the language selector box is displayed (fig. 7). This box is used to select the required language of a translation. When a user selects a language from a language selector box, the original text part is horizontally divided into 2 same size parts. In the top part remains the original English text, and in the bottom part the required translation is downloaded (fig. 8) from the NCTT server. NCTT server generates a page which contains the translation and functional controls to edit and create a new version of the translated text.



Fig. 4. NCTT structure

Providing this service to all NetAcad members in the World means providing service with high availability (HA). The NCTT servers run on the Linux operating system, which has great clustering and HA possibilities. The NCTT server is connected with 100Mbps to the GEANT network. The application code on a server side is written in PHP5 and served by Apache web server. As a database backend the MySQL5 is used.

3.2 User friendly implementation

From the begging of the NCTT project, the main goal was to provide a user-friendly implementation of the translation process. Users are not required to spend so much time by learning a new functionality, but they can easily and intuitively control this new tool.

Tool is activated by installation (Fig. 5 and 6) of the NCTT browser plugin for Mozilla Firefox or Microsoft Internet Explorer (requires Administrator rights). After successful installation the language selector box is displayed in the supported NetAcad curricula (fig. 7).

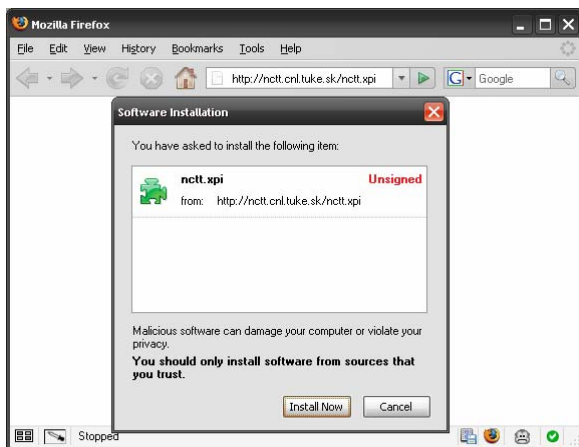


Fig. 5. NCTT extension for Firefox

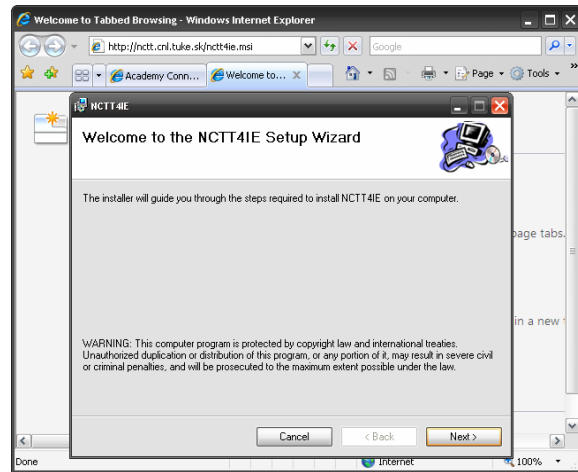


Fig. 6. NCTT plugin for IE

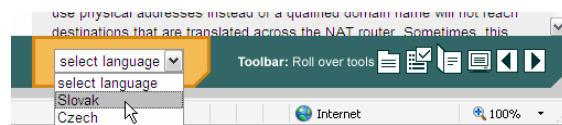


Fig. 7. Language selector box

The plugin injects the NCTT code which constantly monitors the displayed page. After selecting the required translation from the Language selector box, the text part of a displayed page is split into 2 parts as it is described below. Into the bottom part a new web page is downloaded from the NCTT server which contains the required translation with control buttons (fig. 8). To provide a tight integration with the original GUI the same formatting style are used also in the translated text as are in the original text.

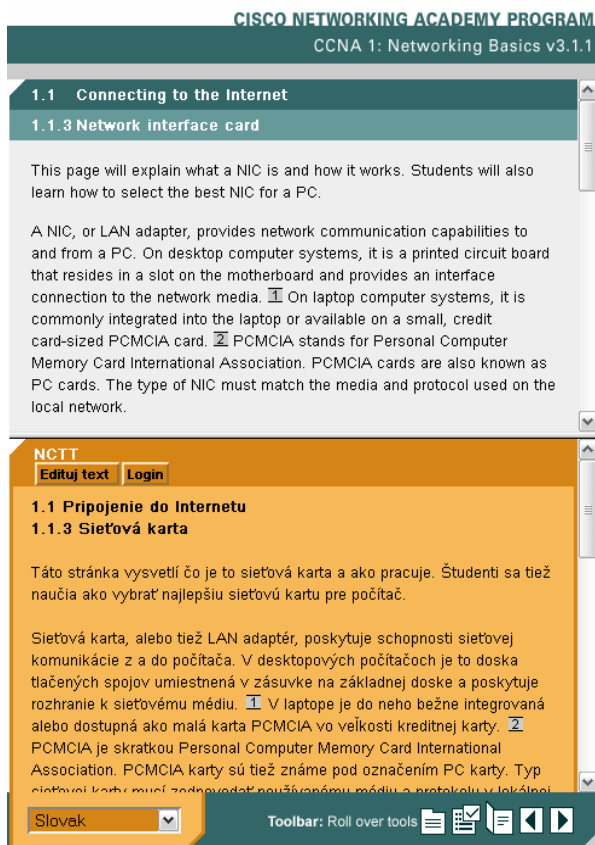


Fig. 8. NCTT view mode

After clicking to the edit button ("Edituj text" @ fig. 8) the displayed text is available for editing in the editor mode. To provide the formatting possibilities special tags were introduced. Most of this tags comes directly from the HTML specification ([b] for bold, [i] for italic, ...) and some are NCTT specific as a star character ' * ' which is used to create a list.

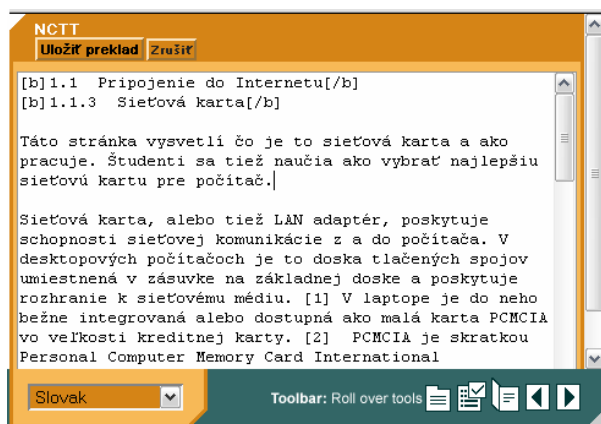


Fig. 9. Editor mode

The new version of a translation which was written in the editor mode can be saved by clicking on the Save button ("Ulozit preklad" @ fig. 9) or canceled by clicking on the Cancel button ("Zrusit" @ fig. 9).

Users can login to the NCTT with their Academy Connection Username and Password to sign their own translations and to access the moderator mode which is available only for privileges users (moderators). Big advantage is that users don't have to have a new authentication username and password but they can directly use their username and password used on NetAcad portal. The actual development process around the authentication is about a single sign-on solution.



Fig. 10. Login

Clicking on the Login button, the provided username and password is authenticated against the Academy Connection (fig. 10). After a successful authentication a welcome message with a user privileges is displayed by the NCTT text (fig. 12).

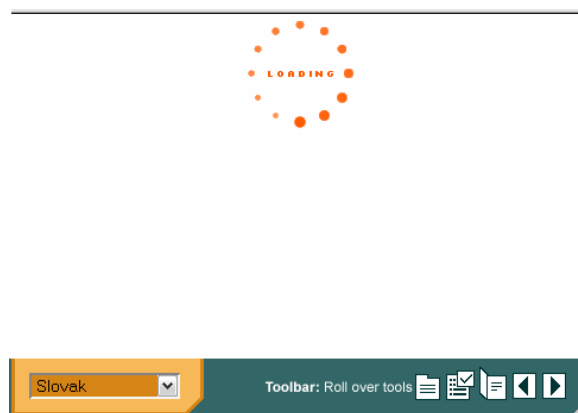


Fig. 11. Validating the username and password



Fig. 12. Welcome message

New version of a translated text created in the editor mode is not directly published as a new official version (traditional wiki systems approach, e.g. Wikipedia), but it is put into a moderating queue (fig. 13). This queue contains all edits which were saved and now are waiting for a moderator to accept it and declare as the official best version of translation. Every user can see translations in the queue, but only a moderator can approve them.

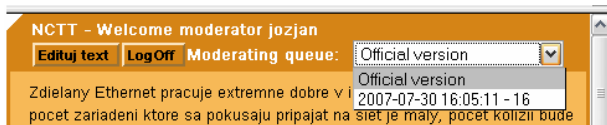


Fig. 13. Moderating queue

After selecting a new version from the Moderating queue menu, the requested version is displayed for viewing. An additional button is then displayed which allows to switch to a diff view. Diff view highlights the changes between the officially approved version and the new version (fig. 14). If the logged in user has a status of a moderator then the “Make Official” button is displayed which can be used to declare the just displayed version as an official version of translation. After clicking on this button, all other versions are put into an archive.

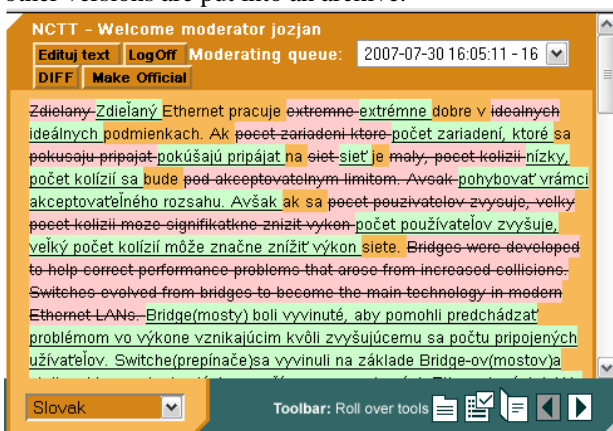


Fig. 14. Diff view

4 NEEDS FOR MODERATION

The open philosophy of most wikis, allowing anyone to edit content, does not ensure that all editors are well-meaning. This issue can be addressed with sophisticated systems which can detect bots or malicious inputs. In huge communities, the community itself is able to maintain the wiki clean as much as possible. Most of these solutions are based on generating some diff views between submitted versions and comparing them. If everyone can directly publish changes in content, then it can lead to huge changes of content, because some editors may think that their version is better than the others. Some companies may also require not publishing their own intellectual properties or information or even advertisements to other companies. To provide this level of quality of officially published content the moderators role and the moderation process has to be defined.

There is one drawback of the moderation - slower process of growing of a created content. When a moderator is a human, he has to check every day the new changes (or this information can be delivered to his email by an automatic system) and then he has to choose which uploaded version in his moderator queue is better, which

will be published as a new official version. This makes the whole system slower, the reaction time depends on the moderators, but on the other hand, the officially published content is always (or at least in most cases) valid without malicious inputs.

4.1 NCTT moderation process

At the begging of the NCTT project, the edited translations were automatically published as new official versions, like it is implemented in conventional wiki systems. After a testing phase of this open system, the moderation process was implemented to protect the already created translations and to provide some level of control of the translation process.

When a new version of a translated content is created in the editor mode, it is not anymore directly published as a new official content, but it is put into the moderating queue. Access to this queue is implemented in a GUI of NCTT as a dropdown menu. This menu is visible and available for all users, so everyone can review the text waiting for a moderator. To highlight the changes between the just viewed version and the official version users can enable the diff view which provides this feature. On the same way as the official content version, the content versions in the moderating queue can be directly edited by clicking on the Edit button and enabling the editor mode. After saving the changes, the edited text is saved as a new version to the moderating queue. If a user was logged in to the NCTT, while doing a translation working with the editor mode, every change is signed with his username. This may be useful information while generating some statistics of the translation process.

When a moderator is logged in into the NCTT, he has an additional functionality enabled - he can approve which version in the moderating queue will be published as a new official version. If he decides to do some changes in the viewed version, he can edit in by switching into the editor mode and saving his changes as a new version to the queue. After selecting and approving a new official version from the queue, all other versions which were created prior to the moderating time are placed into the archive.

5 EVALUATION OF NCTT

Information about the NCTT tool was officially presented to the public on the Annual NetAcad conference in Prague (12.-13.4.2007) and academies expressed great interest to become involved in the project. Afterwards information about the project was send to all schools involved in NetAcad program in Slovakia (54 schools). They obtained access to the NCTT tool and received instruction about usage.

The 1st phase of the NCTT tool implementation was realized in Slovakia only. During this phase only the CCNA curricula were supported.

Totally 21 academies participated in the testing phase. They informed us about the process of testing by sending information which part of the curricula they work on. Mostly NetAcad instructors were involved in this particular phase. Instructors together with students tried to create subsidiary translations of the NetAcad curricula in past – to make study easier. This pilot phase allowed legalizing prepared translations and making them available via NCTT tool to all NetAcad community. Four academies allowed students use the NCTT tool in study, even if it was not the 1st phase main goal. The student's reactions which encounter the translation tool were very positive.

The primary intention was concentrate on translation of the CCNA1 materials; however during the evaluation of the project 1st stage it turned out that also other semesters (CCNA2, CCNA3 and small part of CCNA4) were translated.

Statistical data from 1st phase of testing:

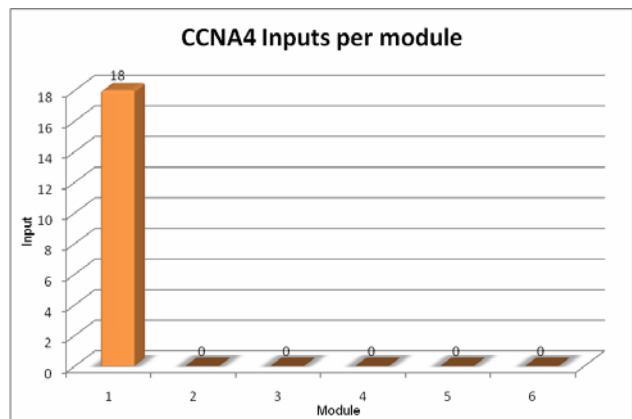
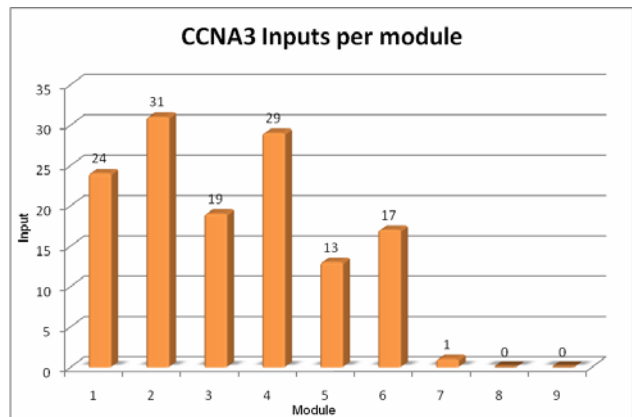
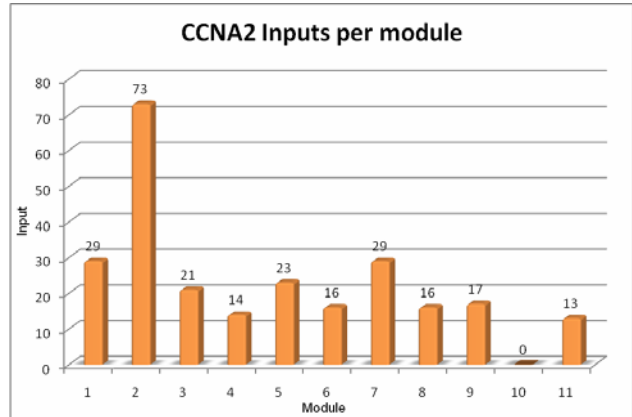
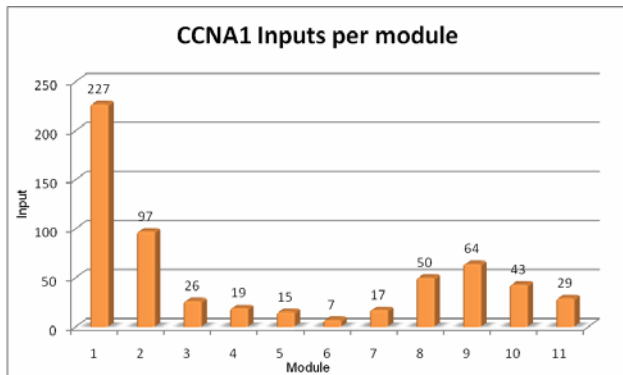
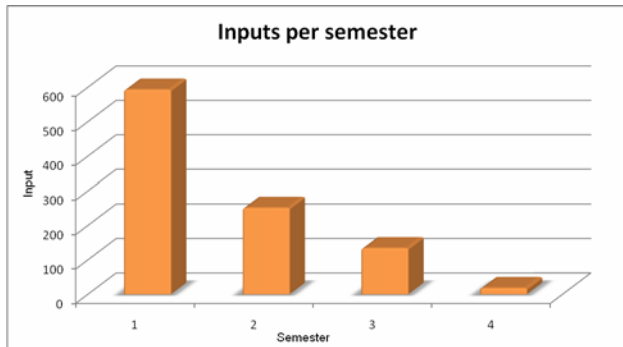


Fig. 15-19. Inputs per semesters

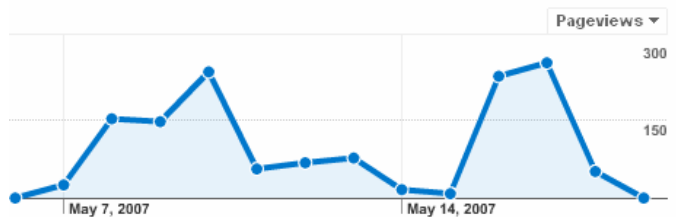


Fig. 20. Access distribution in the first testing period

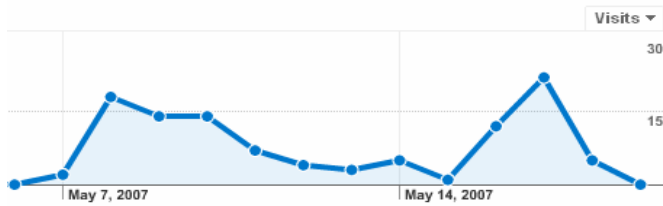


Fig. 21. Access distribution per date of unique visits

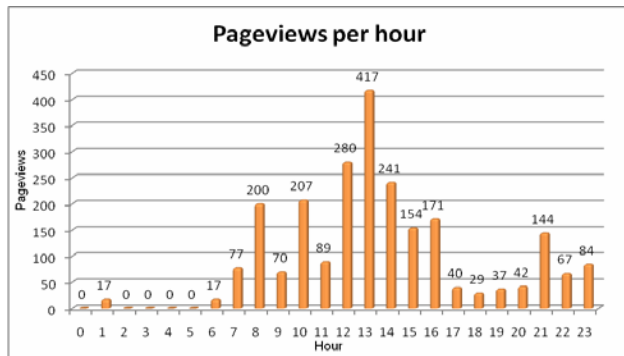


Fig. 22. NCTT time distribution of usage

6 RESULTS OF EVALUATION

The NCTT tool was accepted by the Networking academy community with great appreciation. The community showed great interest in its use during the education process.

Especially the simplicity of the NCTT tool was appreciated – it could work practically without any restrictions and without any violation of existing curricula.

The developed solutions appeared to be stable and steady enough – no operational problems arise during the monthly pilot operation phase.

It was recommended to continue in project by 2nd stage with maximal tool extension for all NetAcad students and instructors in Slovakia and for selected countries.

During the 2nd phase (May - August 2007), after reviewing users feedback, additional development created new features like the moderation, some changes have been done to GUI and the support of the NCTT was extended also to cover other courses and curricula.

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BIOGRAPHY

František Jakab was born in 1959. He received the MSc. degree in Systemotechnic engineering at the St. Petersburg Electrotechnical Institute (Russia) in 1984 and the PhD. degree in 2005. He is employed as an assistant professor at the Department of Computers and Informatics of the Technical University of Košice, Slovakia. He is a head of the Computer Engineering Group and Computer Networks Laboratory (www.cnl.tuke.sk). His research interests include projecting of computer network, modeling, simulation and network management, new form of multimedia-based communication, QoS, telelearning systems, intelligent tutoring systems. He has been a coordinator of several large international e-learning oriented projects supported by EC. He is a coordinator of the Cisco Networking Academy Program for the Slovak Republic and head of the Application Section of the Communication Technology Forum Association in the Slovak Republic.

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