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TERADATA UNIVERSITY NETWORK: A NEW RESOURCE FOR TEACHING LARGE DATA BASES AND THEIR APPLICATIONS

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ABSTRACT

A free learning portal designed to help faculty to teach, learn, and connect with others in the fields of data warehousing, DSS/BI, and database is being made available by Teradata, a division of NCR. Teradata worked closely with leading academics to create the Teradata University Network (www.teradatauniversitynetwork.com). The network is reached by faculty through a portal that includes (1) course syllabi; (2) access to software; (2) Power Point presentations (with speaker's notes); (4) cases, projects, and assignments (with teaching notes); (5) book chapters, articles, and research reports; (6) the Teradata library; (7) web-based courses; and (8) links to related sites.

In addition, a separate portal for students, located at www.teradatastudentnetwork.com, leads to a subset of the above materials, including (1) access to software; (2) cases, projects, and assignments (without teaching notes); (3) book chapters, articles, and research reports; (4) the Teradata library; and (5) links to related sites. The student site excludes materials that are only for course instructors.

This tutorial describes the creation of the Teradata University Network (TUN), discusses how faculty access and use TUN, describes how a faculty member might use it in a typical session, and faculty reactions to TUN. Special attention is given to the software available on TUN and TSN. It also discusses working with Teradata and TUN and provides lessons learned to help other faculty involved in vendor-supported initiatives.

Keywords: Teradata University Network, Teradata Student Network, data warehousing, DSS/BI, database, teaching, learning portal

I. BACKGROUND

In 2001, Teradata, a division of NCR and a vendor of terabyte-size database products, decided to develop closer ties with colleges and universities. Up to then, Teradata participated only in a few individual relationships with selected Computer Science and MIS departments. One such relationship was with the MIS, OM, and Decision Sciences Department at the University of Dayton (UD), to which a combination of NCR and Teradata business units donated a Teradata server and software¹. Jeff Hoffer, the contact at UD, encouraged Teradata to create a data warehousing community of academics and Teradata associates.

Teradata's objectives for a new and wider initiative with colleges and universities included:

- (1) students to be more familiar with Teradata's products,
- (2) to be better positioned to hire outstanding college graduates,
- (3) to be more familiar with academic thinking and research, and
- (4) to contribute to information systems education around the world.

To help think through how these objectives might be best met, Teradata contacted Hugh Watson, who had worked with them in the past on various projects. In turn, Hugh asked Jeff Hoffer and Barbara Wixom of the University of Virginia to be part of the deliberations. Both Hoffer and Wixom knew Teradata from working on previous projects.

The discussions led to the decision to create the Teradata University Network (TUN), a premier learning and teaching resource for faculty interested in data warehousing, data mining, DSS/BI, and database. Faculty would be able to access a variety of resources (e.g., ranging from articles to software) using a web browser. Students would be able to access portions of the network through a companion resource called the Teradata Student Network (TSN). An important decision was that leading academicians in the field would provide the guidance and direction for TUN and TSN through an Advisory Board. Teradata would provide the financial resources, develop and maintain the TUN website, and contribute educational content.

The initial plans for TUN were presented at Partners 2001, Teradata's large users' group conference. In addition to Teradata management, leading academicians were in attendance for the presentation and learned about TUN. The presentation solidified the support for TUN and generated valuable suggestions.

During the next year, many important milestones were accomplished. Membership on the Advisory Board was finalized. Hugh Watson was named Director, Jeff Hoffer (University of Dayton) and Barbara Wixom (University of Virginia) were named Associate Directors. Paul Gray (Claremont Graduate University), Sal March (Vanderbilt University), Arun Sen (Texas A&M University), and Robert Winter (University of St. Gallen, Switzerland) were named to the Board. Also named to the Board were Ron Swift (Teradata) who provided much of the early support for Teradata's educational initiative and Alan Chow (Teradata) who later became the initiative's executive sponsor.

During the next year, the initial design and testing of TUN and TSN were completed, and content began to be added. Promotion of TUN and TSN began at AMCIS 2002 with promotional flyers and with an announcement on ISWorld in September 2002.

At Partners 2002, TUN was presented once again. At this session, Alan Chow, who is in charge of Teradata product development and sales support, committed the resources needed to make Teradata software available through an ASP arrangement. Data would be loaded into a Teradata database server, and faculty and students could access and analyze the data using a web

¹ NCR's headquarters are located in Dayton, Ohio.

browser. Colleges and universities would not have to obtain, install, and maintain the Teradata database and other software.

Through the fall of 2002 to the summer of 2003, Teradata and MicroStrategy (one of Teradata's business partners) software were placed on servers, loaded with data, and tested. In August 2003, the availability of software was announced to TUN members and through ISWorld so that faculty could plan to use it in their fall 2003 classes.

The following sections of this tutorial describe:

- How faculty and students can access TUN and TSN (Section II),
- The available software (Section III)
- A typical session using TUN (Section IV)
- Reactions to TUN (Section V), and
- Lessons learned (Section VI).

II. ACCESSING AND USING TUN AND TSN

To gain access to TUN, faculty must first go to www.teradatauniversitynetwork.com and register. In addition to providing information such as name, university, and desired password, applicants must provide the URL of a web page that shows that they are a teaching faculty member. TUN contains material that is only for faculty members, such as the solutions to cases, projects, and assignments. Once their application is authenticated (usually within 24 hours), faculty can access TUN using their email address as their ID and the password that they specified.

The portal's content includes:

1. Course syllabi (for data warehousing, data mining, DSS/BI, and database courses)
2. Access to software (Teradata database, MicroStrategy, a dimensional modeling tool, with more software to come)
3. Power Point presentations (with speaker's notes)
4. Cases, projects, and assignments (with teaching notes)
5. Book chapters and articles
6. The Teradata library
7. Web-based courses (1 to 2 hours in length)
8. Links to related sites

A separate site for students, www.teradatastudentnetwork.com, contains a subset of the above materials, including:

1. Access to software
2. Cases, projects, and assignments (without teaching notes)
3. Book chapters and articles
4. The Teradata library
5. Links to related sites

TSN is protected with a password that is changed three times a year, corresponding with changes in the academic terms. Faculty can learn the password on TUN or receive it through regular communications as a TUN member.

III. TERADATA SOFTWARE ON TUN AND TSN

A separate site maintains all but the downloadable software for TUN and TSN. Special care was taken to create a software environment that would be easy for faculty and students to use. Consider the case of the Teradata software. The ASP site includes:

1. The Teradata DBMS, SQL Assistant / Web Edition (this commercial tool is provided by Teradata to customers. It is an easy-to-use web interface that helps someone write, edit, save, and run SQL commands and then recall prior commands and results from history)
2. Pre-loaded databases from several leading database textbooks
3. Software tutorials and reference manuals

A FAQ section will evolve. The plan for the future is for faculty to be able to submit additional databases. Currently, databases are read only.

Use of the SQL Assistant software is characterized by the following:

1. For protection of the site's resources, a faculty member must register separately on the software site.
2. Registration is coordinated with TUN membership. Once the match with TUN membership is made, faculty can create an SQL Assistant login.
3. An instructor creates one or more course environments for her or his students. The environment contains a default database for each course that is automatically activated for any student working on that course. A course may be password protected. Students must know the password to gain access to the particular course environment (e.g., a 'course' could be an environment for an on-line examination, and the instructor does not give out that password until the time of the exam).
4. Besides the default database, other databases may be activated for a course. The instructor can change the specifications for a course at any time, including what databases are activated. For example, a faculty member can activate a practice data set for assignments, then activate a new data set for an examination, and then deactivate the second data set after the examination.
5. Finally, because we do forget even critical information, instructors can store an SQL Assistant password hint with their registration. By providing the value of a hint, the system will e-mail the forgotten password to the instructor.

We illustrate some of these capabilities and steps in the next section.

IV. A TYPICAL SESSION

Consider how a typical faculty member might use TUN and TSN. Professor Terabyte is teaching a database course for the first time. After becoming a TUN member, he goes to the TUN website and looks at the various course syllabi that are available (Figure 1a, 1b, and 1c). He finds one that has the mix and technical topics that he plans to include. It is even from the author of the textbook that he plans to use. He then looks at the cases, projects, and assignments that are available (Figure 1d) and finds several that meet his needs. All of them have teaching notes, which will make his work a lot easier.

He also finds several PowerPoint presentations that he can customize and use (no illustration provided, but many are found via the link of the same name on the Teach page shown in Figure 1b). Professor Terabyte then sees that the data set for the textbook that he is planning to use is available in a Teradata database that students can access from TSN (shown later in this section). To bring himself up-to-date on recent developments in the field, he even subscribes to several of the electronic newsletters that are available from TUN's related sites section (found off the Connect link on the TUN homepage). In about an hour, Professor Terabyte obtains great ideas

a. First Part of TUN Homepage with Teach Links; Choose 'Click here' to Enter Teach Section

b. Teach Section Page, Click on Blue Link to Access Desired Resource

The screenshot shows the Teradata website interface. The header includes the Teradata logo and the tagline "You've never seen your business like this before." The left sidebar contains a "Quick Links" section with links to Home, Teach, Software, Learn, Connect, Submit Content, Browser and Display Settings, Password for Teradata Student Network, and Teradata Student Network. Below this is a "Mission Statement" and an "Educator Spotlight" section. The main content area displays a table of course syllabi resources.

Database	Data Management	Data governance, data models and modeling, data storage, Internet/Web based systems, object oriented databases, OLAP, ODS	Graduate Aug-02	Rick Watson, U of Georgia	A data management course with a strong emphasis on data modeling and SQL.	Rick Watson, U of Georgia
DSS/BI	Building Decision Support Systems	AI, DSS/BI, CRM, data mining, development methodologies, emerging trends, EIS, expert systems, hardware/software requirements, information requirements determination, interface design, Internet/web-based systems, knowledge management systems, OLAP, organizational issues, project management, ROI	Graduate Aug-02	Hugh Watson, U of Georgia	This is for a traditional 15 week MBA level course on building decision support applications.	Hugh Watson, U of Georgia
Data Warehousing	Special Topics in Data Warehousing	Data mart, data models and modeling, data warehouse architecture, enterprise data warehouse, meta data	Graduate Jan-02	Arun Sen, Texas A&M University	This is a course syllabus for a semester-long course in data warehousing.	Arun Sen, Texas A&M University
Data Warehousing	Enterprise Systems	CRM, data mining, data models and	Graduate Dec-01	Barbara Wixom, U of Virginia	This is for a three weekend,	Barbara Wixom, U of Virginia

The browser address bar shows "http://www.teradata.com/" and the status bar shows "Internet".

c. Sample of Course Syllabi Resources as of July 15, 2003

The screenshot shows the Teradata website interface with the "Cases, Projects, and Assignments" section selected. The left sidebar is identical to the previous screenshot. The main content area contains a paragraph about recommended cases, projects, and assignments, followed by a note about selecting content. Below this is a table of cases.

Cases, Projects, and Assignments

Below are recommended cases, projects, and assignments that are available for your use with data warehousing, DSS/BI, and database classes. Do you have cases, projects, and assignments that would add value to this site? If so, click [here](#) and you will be asked about the content and given instructions for submitting it.

Note, when selecting content, a new browser will open to display the content. This browser usually opens a new window on your desktop. However, sometimes the new browser will open to your Task Bar at the bottom of your computer screen.

Course Type	Name	Topics Covered	Audience	Date Created	Citation	Description	Content Submitter
Data Warehousing	Data Warehouse Governance at Blue Cross and Blue Shield of North Carolina	Data governance, data models and modeling, data quality, data warehouse justification, ETL, information requirements justification, training and support	Undergrad, Graduate, Executive Education	Aug-02	This case study was written by Hugh Watson, Celia Fuller, and Thilini Ariyachandra.	This case study describes the award winning data warehouse governance practices at Blue Cross and Blue Shield of North Carolina. It also describes the warehouse, training and support, and the benefits realized.	Hugh Watson, U of Georgia
Data Warehousing	3M Moves to a Customer Focus Using a Global Data Warehouse	CRM, data governance, data warehouse architecture, data warehouse justification.	Undergrad, Graduate, Executive Education	Aug-01	"TDWI Industry Study: 2000: Harnessing Customer Information for Strategic	This case study describes the development of a data warehouse at 3M. It emphasizes the justification process, the technical infrastructure, and benefits. It	Barbara Wixom, U of Virginia

The browser address bar shows "Done" and the status bar shows "Internet".

(d) Sample of Cases, Projects, and Assignments Resources as of July 15, 2003

Figure 1. Accessing Syllabi and other TUN Resources

for teaching his database course and identified some of the resources that he now plans to use. He will definitely be back next semester when he will be teaching a data warehousing course for the first time.

Professor Terabyte knows that providing access to database software can be, by itself, a burden. In the past, the software was often difficult to install and maintain. Students often needed to go to a computer laboratory to gain access to it or had to work through a difficult installation of software on their personal computers. Sometimes a student had to get by with only simple tools because only simple tools were reliable. Then, every few years, the instructor had to renegotiate with his or her university to upgrade the software to a new release. And, any data sets the instructor wanted to use required periodic loading and protecting.

The software resources on TUN overcome these issues. Selecting the Software link on the TUN homepage (Figure 1a), Professor Terabyte finds the links to a dimensional modeling tool and the Teradata ASP server. He chooses to go to the Teradata ASP site to explore whether it can provide the SQL processing capabilities he wants for his students (Figure 2a shows the Teradata ASP homepage). He reviews the TUN Web Tutorial, finding that he can create an SQL processing environment for his students, and the data sets for his chosen textbook are already loaded on the site. He also discovers that he must register for an SQL Assistant account (see the 2nd link on the ASP site homepage). He will register only once, using his TUN ID and password, to verify that he is an authorized instructor, and then setting an SQL Assistant login ID and password, which the software needs.

Now Professor Terabyte is set to create a course environment, which he does by selecting the Course Management link off the SQL Assistant signup page². His options are to create a course, modify or delete a course, or manage databases for a course. He, of course, starts by creating a course environment for the class he will teach (Figure 2b). Before picking the default database

² To reach the SQL Assistant signup page, click on the rightmost element in the standard menu bar on the ASP homepage (Figure 2a).

a. Teradata ASP Site Homepage

Teradata
a division of HCR

Create Course

[HOME](#) | [MANAGE DATABASES](#) | [MODIFY/DELETE COURSES](#) | [LOGIN TO SQL ASSISTANT](#)

Complete the form below to add a course. Type the name of the course and select the type of course and the database you want to be the default assigned to students that register for the course. You may also enter a password that students will be required to enter in order to register for the course.

Enter the title of the course you wish to create and choose the appropriate course type that describes the course.

Course Title

Course Type

Select the default database for the course. The database you choose will be the default database assigned to each student that registers for this course

Default Database [Click here for a description of these databases](#)

Choose a password to assign to the course. This password will be required in order for a student to register for the course. The password is optional, but if you do not supply a password anyone visiting the web site may register for your course.

Course Password (optional)

Done Internet

b. Course Creation

Teradata
a division of HCR

Manage Course Databases

[HOME](#) | [CREATE COURSES](#) | [MODIFY/REMOVE COURSES](#)

This page allows you to activate and deactivate databases for your courses. To add a database to a course, choose the name of the course from the drop down menu, select the name of the database from the Available Databases on the left and press the right arrow to add it to the Selected Databases. This activates the database for the students registered for the course. To remove a database, choose the name of the course, select the name of the database from the Selected Databases, and click the left arrow to deactivate access to the database for the students registered for the course. All students registered for the course will have access to the databases listed under Selected Databases for that course. The default database for the course is identified with the word 'default' in parenthesis.

Course:

Available Databases:

- db_mvch1
- db_mvch2
- db_watson

Selected Databases:

- db_pvf(default)

[Click here for a description of the databases](#)

Done Internet

c. Adding a Database to the Course

Figure 2. Using the Teradata ASP Site

(the one that will automatically be active for a student who signs on to his course environment), he clicks on the link next to the default database selection to see a description of the available databases. He picks the Pine Valley Furniture database, which is the one he wants to use for homework exercises in his class. Professor Terabyte also wants to limit access to his course environment by assigning a password, which he will give only to his students.

Selecting the manage databases link (see the menu bar at the top of Figure 2b) he adds the first of the two Mountain View Community Hospital data sets to his course (Figure 2c). He will use this database for in-laboratory training sessions on SQL. Professor Terabyte selected his course from the drop-down selection, and then selected the 'db_mvch1' data set for this second database. He is now ready to click on the right arrow to move it to the list of selected databases for his course. Later (not illustrated here) he will create a second course environment (called MIS385 SQL Exam), using the other Mountain View Community Hospital data set as the default database, which he will use during the in-laboratory hands-on SQL examination. This other "exam" course will also be password protected, and he will give the students the password at the time of the examination.

Professor Terabyte is eager to use SQL Assistant / Web Edition. So, he selects the HOME link in the menu bar, reads the SQL Assistant tutorial, learns about the Teradata reserved words, and glances at the .pdf file of the SQL Assistant user manual (Figure 3a). He then selects the link to SQL Assistant. After selecting the TUN server and logging in using his SQL Assistant ID and password, he is ready to enter a simply query. He first expands the db_pvfc directory on the left to see what tables are loaded (Figure 3b). He enters a simply query to display all the rows in the customer table. On the screen he has a window for entering the query (with a place to recall a stored query, which is really useful for students as they are learning SQL to be able to recall

a. the SQL Assistant resources (see bottom of screen)

b. Example of a Simple Query via SQL Assistant

Figure 3. Using SQL Assistant / Web Edition

previously written queries for slight modification). He also sees a history of all the queries that have been run. Scrolling down the screen he sees the complete answer set. The answer set can also be saved, so a student can save the query and answer set to a text file, to form a report to submit for his or her homework assignments. Professor Terabyte likes students to submit a report for each homework with their queries and resultant answer set along with an explanation of the structure for each query. SQL Assistant will be perfect for helping the students capture their work for this report.

In less than 45 minutes Professor Terabyte set up his course environment, explored the Teradata SQL site, and ran a sample query.

V. REACTIONS TO TUN

The Teradata University Network Educator Spotlight (reached from the TUN homepage, as shown in Figure 1a) recognizes faculty members who

- make important contributions to the design of TUN;
- make significant contributions to the network's content; or
- use the network in significant or creative ways.

Comments from these spotlighted educators provide additional insights about TUN.

A common theme is the ability to find, in one place, up-to-date materials about a rapidly changing field such as data warehousing and DSS/BI. Board member Sal March (Vanderbilt University) states it this way:

"As an educator it is always difficult to keep up with current IT developments, particularly in data warehousing and business intelligence. In addition, even if I am knowledgeable in an area, it often is difficult to know how to communicate it in a classroom context. While I have an informal network of colleagues, it takes considerable time and effort to find out what textbook and case study materials they are using, what assignments they use, and how they use them. ... The Teradata University Network provides a wide range of materials for classroom use including syllabi, case studies, teaching notes, exercises, and their solutions. These are invaluable to me as I plan and develop my own courses." It is also important that TUN's content is peer reviewed. Board member Robert Winter (University of St. Gallen) says "the material is quality checked by peers, which makes this platform superior to other sources of unknown quality (e.g., vendor and consultant sites)."

A valuable feature of TUN is web access to Teradata's database software. Marie-Claude Boudreau (University of Georgia) describes her teaching needs:

"I teach a Database Management class to undergraduate students. A key learning objective of this class is SQL. Students are expected to formulate and execute complex queries by the end of the semester. A request often voiced by my students is the need for hands-on exercises in addition to the ones I give in class and in the laboratory. Indeed, I keep telling my students that they cannot learn SQL only by reading the textbook, and that they should spend a lot of time practicing writing and running queries within a database."

Marie was a beta tester of the use of Teradata SQL Assistant Web Edition on TUN. In describing her experiences, she observes:

"I have been pilot testing the product in my undergraduate database class throughout the winter semester. With the Teradata SQL Assistant, I can direct my students to a user-friendly tool, fulfilling their need for more practice. On a 24/7 basis, and from any web-accessible location, students can experiment with the database (from our textbook) that was uploaded to the Teradata server."

VI. WORKING WITH TERADATA AND TUN

The Teradata University Network exists because of the help and support of many people at Teradata, and the resources they made available. It is a significant event when a major vendor contributes to the education of future IS managers and professionals. For many years, IT vendors provided relatively little support for their academic counterparts. The situation is changing, however, because major companies, such as Teradata, IBM, Oracle, SAP, and MicroSoft, undertook a variety of university initiatives. The resources offered to IS programs by Teradata and other companies make it possible to provide educational experiences to students that otherwise would be difficult or impossible to give, such as training on state-of-the-art technology.

What differentiates Teradata's initiative is that leading academics are primarily responsible for the TUN vision, the development of TUN, and the evolution of TUN. The Senior and Associate Directors work with Teradata and other Advisory Board members as a management team to ensure that TUN meets the needs of the IS academic community. Project teams, led by Board members, work closely with Teradata staff to make decisions, test prototypes, obtain beta testers, make design decisions, and timeline activities.

Working with Teradata on TUN is an exciting, satisfying, and valuable experience. We meet and interact with most of the Teradata senior management team, which allows us to communicate the vision and plans for TUN to the highest organizational levels. We better understand Teradata and the opportunities and challenges that the company faces in the marketplace. Teradata senior management and other associates better understand the needs of academia. As a result of these

interactions, we feel like extended members of the “Teradata team” and that Teradata’s management is closer to and identifies better with TUN and the academic community.

It is satisfying to be developing a resource that is for the good of the IS faculty and students. Hopefully, hundreds of faculty and thousands of students will benefit from using TUN and TSN. As of June 2003, users from 158 universities in 28 countries around the world registered with TUN, with membership growing daily. As more and more faculty members contribute content (e.g., course syllabi, cases) to TUN, its value to everyone increases.

Working with TUN and Teradata created experiences and challenges that are similar to those associated with developing any new, large system. This work is “fun” because as faculty members with “day jobs,” we often do not have the time or the opportunity to build large-scale systems. It is also enjoyable to work with a major vendor, to meet and interact with its senior management and other managers and professionals, and to deal with communicating to and educating Teradata about the peculiarities and nuances of academia. Discussing commercial products as they are applied in university teaching is enlightening to everyone. We all discovered that the needs of software often are different between commercial and university training settings.

VII. LESSONS LEARNED

The experiences of working with Teradata and TUN provide lessons learned that might help other people who become involved in vendor-sponsored initiatives.

Lesson #1. It can be a challenge to define objectives clearly for the initiative. When faculty drive an initiative, the desired outcomes for the academic community are relatively easy to identify. However, identifying the outcomes on the vendor’s side and finding the one-for-one match with academic objectives may be more problematic. It may be that support for the initiative originated lower in the organization and senior management signed off on a general concept but did not clearly define and prioritize goals for the project. Senior management is driven by revenue, customer satisfaction, and cost control. If academics are seen as customers, then our academic goals can be linked with the vendor’s goals.

When initially discussing TUN, many different possible objectives surfaced. However, because of senior management’s busy schedules, it was difficult to carry on in-depth discussions on specific objectives for the initiative and to establish specific priorities. Consequently, the TUN Board made decisions based on what it knew and moved forward. The decisions were apparently good, because Teradata’s support continues to grow.

Lesson #2. The need for excellent communications cannot be overemphasized. An initiative like TUN involves multiple constituencies (e.g., academia, Teradata), people at different organizational levels (e.g., senior management, system developers), with the major participants spread across the country and the world. It is a challenge to keep everyone up-to-date, motivated to work, and supportive.

Regular emails and conference calls are necessary. Updates on the status of TUN are sent to Teradata management, system developers, and Board members. Conference calls are used to discuss the status of various aspects of the project, consider problems and issues that emerge, and review the applications and screen that are developed.

Lesson #3. There is no substitute for face-to-face meetings. Even with today’s communications technologies, face-to-face meetings are necessary. They develop personal relationships, build trust and confidence among team members, and create a focus of attention by virtue of people physically coming together in the same place. Some work simply cannot be done without some face-to-face time. Fortunately, carefully planning how to use time at the Teradata Partners Conference and scheduling a few other key meetings minimizes travel while achieving multiple objectives.

The major opportunity to meet and discuss TUN occurs at Partners. It brings together, Teradata management, the TUN Advisory Board, and other invited guests. Mary Gros, who is the major coordinator and facilitator for TUN, carefully plans the events and sessions and acts as the internal interface to senior management. Becky Salsbury, a Teradata marketing associate, coordinates details, helps to set agenda, and oversees the work of different project teams. There is a Sunday dinner where people get to meet and get to know one another. There is a session that is open to everyone where TUN is demonstrated and discussed. Then there is a meeting of Board members to discuss future directions and plans for TUN.

The Director and the two Associate Directors also meet semiannually with Teradata to discuss TUN, either in Dayton, Ohio, the corporate home of NCR, or in Rancho Bernardo, California, where the Teradata's software developers are located. Ad hoc meetings in Rancho Bernardo discuss TUN software development issues.

Lesson #4. By and large, vendors want to work with academia. Working with faculty and contributing to the education of students is appealing to vendors. Some vendors cannot do this because of their small size and limited resources, and others may not know how to contribute, but the underlying feeling toward academia is positive. We positioned TUN as a community in which many vendors (partners with Teradata) are welcome. We have discovered that once one vendor becomes involved, others quickly show interest, not wanting to be left behind.

Lesson #5. A vendor relationship often starts with a personal relationship. In the case of the Teradata University Network, it was between Hugh Watson and Ron Swift, Vice President for Strategic Customer Relationships. Ron was the initial champion for the project and convinced Teradata senior management to develop a university initiative. Jeff Hoffer had also worked with Teradata many times in the past and had planted the seed for a TUN-like initiative with Mary Gros. Barbara Wixom had a friend at MicroStrategy who was helpful in making the its software available to TUN and TSN.

One of the best ways to develop a personal relationship is to ask the person to speak to a class. Many practioners are "closet academics" and thoroughly enjoy sharing what they know with students. Meeting and interacting with our students is perhaps the best way to build vendor interest in working with universities.

Lesson #6. The vendor's interest in ROI may not be stated, but it exists nonetheless. As stated earlier, it is important to always remember that companies make investments for business reasons. At some point, the vendor will be interested in metrics that show return on investment for the initiative. The metrics may not be financial, but they should indicate the initiative's impact.

Teradata has invested in TUN for two years. At Partners, the TUN Directors make a presentation on the status and plans for TUN. In this presentation, and in other communications, we present metrics on the use of TUN – the number of registered members, universities, countries, the amount of new content, how long members visit TUN, the number of pages viewed, and so on. We are also look for how TUN may have affected Teradata's business, such as through students in our classes who are selecting data warehousing technologies and may have been influenced by increased exposure to Teradata.

Lesson #7. Customer support is critical. Teradata understood from the beginning that expectations unmet would be a problem. Thus, they committed the proper resources from the beginning. This support is especially true for the software ASP site, through which faculty and students will depend on seamless and uninterrupted operation. Teradata recognized that academics, like their regular customers, would be 24x7x365, but students especially would be unique. Consequently, Teradata is putting in place special call center support procedures that identify and respond to operations problems whenever they occur.

VIII. CONCLUSION

Teradata made a significant commitment and gift to information systems education. Through a single portal, faculty can access the resources needed to teach courses in data warehousing, data mining, DSS/BI, and database. This capability is especially important in the underdeveloped

parts of the world where it is more difficult to obtain educational resources. Colleges and universities can access state-of-the-art software without the difficulties associated with installing and maintaining it locally. Comprehensive data sets are maintained that give students the opportunity to do realistic, computationally complex queries and analyses.

In the long-run, the success of TUN depends on information systems faculty members. They must find it to be an important resource for their teaching and learning. They must also be willing to share the resources they develop, such as a course syllabus, article, case, or project. On TUN, there is an easy-to-use content submission form that collects metadata about the content submitted and allows the faculty member to attach the content or provide an URL where the content can be accessed.

In data warehousing, the phrase "a journey rather than a destination" is often heard. It is used to communicate that there is never an end point, only an on-going trip. A data warehouse is never completed, there is always more to do. This phrase also applies to TUN. The TUN Advisory Board and Teradata maintain on-going discussions about how TUN and TSN might be even a more valuable resource. We solicit your thoughts about how TUN and TSN can be enhanced and improved.

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